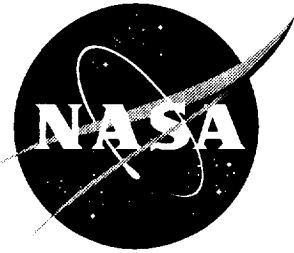


NASA Contractor Report 4786



Observed Changes in Atmospheric Boundary Layer Properties at Memphis International Airport During August 1995

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1. Introduction

Atmospheric boundary layer behavior was measured during a 3 week period at Memphis International Airport in August 1995. These measurements were part of an on-going research program at NASA Langley Research Center into aircraft wake vortex behavior. Wake vortex data were collected simultaneously with meteorological data during several periods of high air traffic volume, whereas atmospheric data collection was continuous from August 7 to 29. Details of the data collection can be found in Campbell et. al. (ref. 1). The near-term goal is to develop and field a prototype Aircraft Vortex Spacing System (AVOSS) that combines meteorological data with wake behavior knowledge to predict safe spacing between arriving and departing aircraft in order to maximize efficiency in terminal areas (ref. 2).

This report summarizes selected subsets of the meteorological data collected during the Memphis 1995 Field Deployment in order to examine temporal and spatial variations in atmospheric boundary layer properties. These subsets of data are from a 45 m instrumented tower, a manual combination of multiple source temperature and wind observations (described in ref. 1 as the atmospheric profiles), and an instrumented NASA OV-10A aircraft (ref. 3) flying approaches to Memphis International Airport runways 36 and 27. The purpose of this investigation was to analyze measured atmospheric variability, as it relates to determining approach corridor weather that may influence wake vortex behavior, from sensors sampling the atmosphere at different locations.

2. Procedures

Analyses were performed on wind and temperature variability in time and space as observed at Memphis during selected times of boundary layer transitions in August 1995. First, temperature changes with altitude for times of maximum stability and maximum instability were extracted from balloon soundings taken at frequent intervals during the deployment. Secondly, changes with time were calculated for one minute averages of tower temperature, humidity, and winds over intervals of 10 minutes, 1 hour and two hours during sunrise and sunset. The period from sunrise until 2 hours after sunrise constituted the sunrise statistics, and the period from 1 hour before sunset to 1 hour after comprised the sunset statistics. These choices were based on known response of the surface air to solar heating and radiative cooling from the ground. Three tower levels were chosen: 5 m, 30 m and 42-44 m above ground level. Results are included in Appendix 1. Thirdly, a combination of data from several sensor sources were used to calculate changes of wind and temperature with height. The combination process essentially combined tower data below 44 m with profiler and radio acoustic sounding system (RASS) data at 100 m and above into smoothed vertical profiles of winds and temperature. Changes were calculated between 10, 30, 100, and 300 m during days when wake vortex data were being collected simultaneously. Only the time periods at 0000, 0400, 1300, and 1800 UTC were considered in the analysis because these were times of coincident Lidar wake vortex measurements when the combined profiles were generated. The results of these calculations are shown in Appendix 2. Forth, OV-10A winds and temperatures were examined during 13 approaches to runway 36 and 3 approaches to runway 27. Vertical changes between 30, 100, and 300 m intervals were examined along with changes during the approximately 1-2 minutes of level flight (corresponding to about 3 to 6 km in horizontal distance traversed) parallel to the runways.

Results are summarized in Appendix 3. Finally, tower data were examined during afternoon convective periods to determine eddy motion and time scales.

3. Results

a. Expected boundary layer behavior. The normal response of the atmosphere close to the ground is strongly dependent on solar and terrestrial radiation, reflection, and absorption. These in turn depend on cloud cover, terrain properties, cloud thickness, water vapor content and winds. At night, or as the sun gets low on the horizon, the ground cools and in turn cools the air above. This process continues until sunrise when the characteristic nocturnal inversion (temperature increasing with height) reaches its peak. The largest changes take place during clear, calm and dry atmospheric conditions. After sunrise, the sun begins to heat the ground which in turn heats the air above. The inversion begins to erode from the ground upward with time until by noon typically the entire lower atmosphere exhibits a near adiabatic lapse rate. During periods of intense heating, local hot spots can produce upward moving air. The void is filled by air moving laterally from surrounding regions. This process creates afternoon convective eddies which are apparent in the tower wind data. In the extreme it can produce thunderstorms.

Winds characteristically respond to thermally driven horizontal pressure gradients. In the lowest part of the atmospheric boundary layer called the surface layer (lowest 10-50 m), directions are expected to change little with height, and speeds typically obey a logarithmic increase with height. Above the surface layer, speeds and directions change with height according to frictional effects and thermal structure especially horizontal temperature gradients and temperature advection in mid-latitude locations. Wind directions back with height or rotate counterclockwise (for example, winds at 300 m from 150 degrees and at 10 m winds from 230 degrees) during cold air advection in a layer of the lower atmosphere, and winds veering (turning clockwise) with height is associated with warm air advection and with surface friction¹. For further information see any introductory meteorology text such as Ahrens, 1995 (ref. 4). Wind speeds depend on horizontal and vertical temperature/pressure gradients, but surface friction slows the speeds near the ground. Speed shears of 15 m/s per 100 m and above are possible in the lowest 300 m of the atmosphere. Strong low-level inversions can shield the winds aloft from the slowing effects of surface friction. Speed typically reaches a maximum at the inversion top then decreases above. This behavior has been observed at Memphis. Turbulence and convection also play significant roles in the evolution of winds in the boundary layer.

The above discussion points out the rapid changes that can occur in roughly the lower 1-2 km of the atmosphere on any given day in transitioning from the morning nocturnal inversion to afternoon instability. This transition is highly non-linear. For a more complete discussion of atmospheric boundary layer behavior see Blackadar (ref. 5) and Kaimal and Finnigan (ref. 6).

¹This clockwise rotation of the wind with height can theoretically occur independent of advection and is called the "Ekman Spiral" after a classic paper by V.W. Ekman on the influence of Earth's rotation on ocean currents in 1905.

b. Observed maximum changes with altitude. Reference 7 quantifies and identifies the dates and times of the strongest lapse rates (temperature change with height) for both unstable (temperature decreases with height typically maximum in late afternoon) and stable (temperature increases with height typically maximum just before sunrise) conditions during the Memphis 1995 deployment. Table 1 summarizes the largest observed temperature changes with height during the deployment. As expected the strongest stable lapse rate in the lowest 150 meters occurred near 1200 UTC on 12 and 18 August 1995. Figure 1 shows the balloon sounding taken at 1200 UTC on 12 August. The steep lapse rate in the lowest 300 m is apparent. Just 90 minutes later (Fig. 2), however, the sun has destroyed the low level inversion. On these mornings the temperature increased with altitude an average of 2 C in 100 m. This lapse rate is by no means exceptional. In typical California coastal fogs lapse rates have been reported just above the surface of 4-10 C per 150 m (ref. 8 and ref. 9). On the other hand, the most unstable lapse rates during the Memphis 1995 deployment occurred on 28 and 29 August when temperature decreased with height on the order of 2-3 C in the lower 150 m. The adiabatic rate is 1.0 C per 100 m so these cases are extremely unstable according to the classification scheme of the Nuclear Regulatory Commission. Again this type of instability near the ground is rather typical of a sunny, not too windy, summer afternoon.

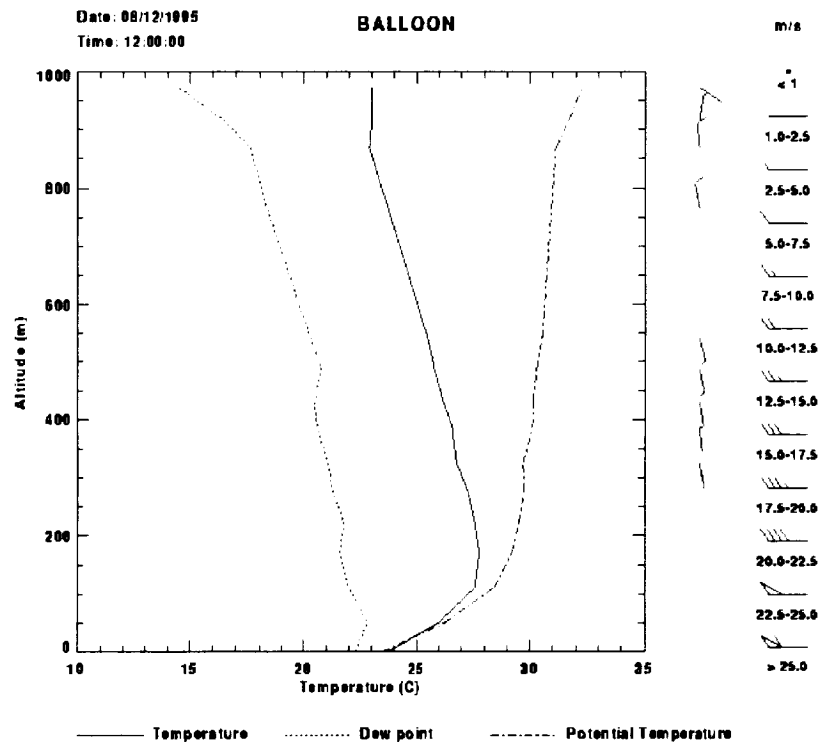


Figure 1. Balloon sounding at Memphis, August 12, 1995 at 1200 UTC .

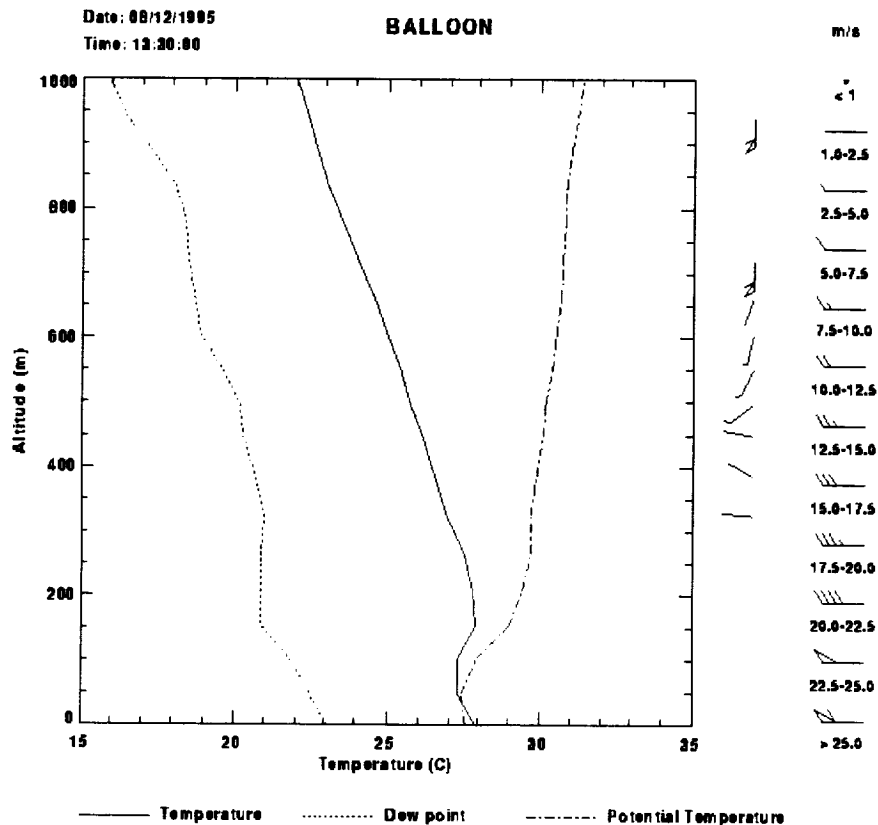


Figure 2. Balloon sounding at Memphis, August 12, 1995 at 1330 UTC .

c. Changes of boundary layer properties with time during solar transitions. Appendix 1 lists the time changes of all parameters at ten minute, 1-hour and 2-hour intervals during sunrise and sunset transitions. Throughout this research u is the east-west component of the horizontal wind vector with positive to the east, and v is the north-south component, positive to the north. Since the runways at Memphis are very close to this north-south, east-west alignment, the u and v components of wind are also considered to be the headwind or crosswind, depending on runway in use.

The sign is maintained for the change calculation according to the convention of subtracting the value observed at the earlier time from the value observed at the later time whether it be 10 minute intervals, a one hour interval or two hour interval. A positive sign change is a warming with time and vice versa. One can see from Appendix 1 that temperatures began warming typically 30 minutes after sunrise at 5 m, 45 minutes after sunrise at 30 m and 70 minutes after at 44 m. This is consistent with expectations for typical boundary layer behavior.

Table 1. Vertical temperature gradients measured during Memphis 1995.

Date	Lidar		Balloon				Tower		Tower		RASS		RASS		RASS	
	Start	Stop	Time (UTC)	Sfc-50m	50-150m	150-300m	Time	5-42m	Time	5-42m	Time	127-338m	Time	127-338m	Time	127-233m
Most Stable																
16-Aug	257	557	600	2	0.7	-1	600	2.1	300	3	600	-0.3	300	-0.3	600	0.2
11-Aug	416	556	600	1.4	1.4	0	600	0.6	400	-0.1	600	-0.5	400	0.4	600	0.3
25-Aug	343	545	300	1.3	0	-0.1	300	0			300	-0.1	400	0	300	0.1
			600	1.3	0	-0.1	345	0.3	545	0	430	0.1	500	0.1	430	0.3
Most Unstable																
28-Aug	1650	1819	1830	-3.2	-1.6	-1.5	1830	-1.5	1650	-1.1	1830	-0.6	1800	-1.1	1830	0
			1700	-1.9	-1.6	-1.4	1700	-1.6	1820	-1.3	1700	-0.9	1730	-1.2	1700	-0.2
29-Aug	1721	1814	1830	-3	-1.6	-1.5	1830	-1.3	1813	-1.8	1830	-0.4	1700	-1.7	1830	-0.8
26-Aug	1722	1809	1830	-2.8	-1.6	-1.4	1830	-1.5	1716	-1.5	1830	-1.1	1700	-0.8	1830	-0.3
									1810	-1.3						
18-Aug	1659	1800	1700	-0.5	-1.5	-1.5	1700	-1	1817	-0.9	1700	0.2	1800	0.3	1700	0.5
											1730	-0.3			1730	0
Evening Transition																
10-Aug	2300	2351	2300	-0.1	-1	-1.5	2300	-0.4	2348	-0.2	2300	0.1	0000	-0.4	2300	0.3
11-Aug			0030	1.4	0	-0.2	0030	2.2			0030	-0.4			0030	0.1
28-Aug	2252	29/0028	2300	-1	-1	-1.6	2300	-0.9	2243	-1	2300	-0.4	0000	-0.2	2300	0
29-Aug			0030	0.4	-0.9	-1.4	0030	-0.3			0030	-0.2			0030	0.1
Morning Transition																
18-Aug	1229	1301	1200	2.4	1.4	-1.1	1200	2.2	1230	0.5	1200	m	1230	m	1200	m
			1330	-0.5	0	-0.7	1330	-0.5	1304	-0.3	1330	-0.2	1300	-0.3	1330	0.1
12-Aug	1229	1310	1200	2.3	1.8	-0.8	1200	2.4	1229	1.2	1200	-0.9	1230	-1.1	1200	-0.1
			1330	-0.6	0.6	-0.8	1330	-0.5	1306	-0.5	1330	-0.8	1300	-0.7	1330	0
19-Aug	1233	1302	1200	0.6	0.4	-0.1	1200	1	1219	1.2	1200	-0.1	1300	0	1200	0.2
			1330	-0.3	-0.6	-0.4	1330	-0.5	1304	-0.2	1330	0.2			1330	0.6
Elevated Inversion																
26-Aug	1241	1320	1203	0	-0.1	2.8	1203	-0.3	1230	-0.4	1200	2.2	1230	1.8	1200	1.4
			1330	-0.4	-0.7	2.2	1330	-0.8			1330	2	1300	1.9	1330	1.1
Stable with Shear																
15-Aug	338	605	300	0.8	0.6	-1.2	300	0.8	605	0.8	300	-0.4	400	-0.5	300	0
			600	0.8	1	-1					600	-0.2	500	-0.5	600	0
															500	-0.1

The maximum changes at 30 m observed at Memphis in August 1995 during the sunrise transition are shown in Table 2. Maximum 10 minute warming of 0.61 C occurred at 30 m on 9 August but the overall maximum of 0.84 C occurred at 42 m on 16 August (from Appendix 1). The greatest two-hour temperature change of nearly 4.0 degrees occurred during clear, relatively light wind situations at 5 m on 18 August. This is by no means a worst case scenario. Boundary layer temperature changes of 10 C per hour have been observed during Great Plains morning transitions (ref. 5).

Table 2. Changes in temperature and wind at 30 meters altitude during the morning transition.

Date	Clouds	Wind (Knts)	2 hour Temp. (C)	Maximum			
				10 min.			20 min.
				Temp. (C)	U (m/s)	V (m/s)	U or V (m/s)
7-Aug-95	PtlyCldy	SW-8	1.23	0.25	1.29	-1.26	2.15
8-Aug-95							
9-Aug-95	PtlyCldy	SE-6	0.92	0.61	1.15	-2.54	3.30
10-Aug-95	PtlyCldy	Vrbl-5	2.10	0.37	1.30	1.08	2.44
11-Aug-95	Clear	SW-4	2.45	0.46	0.93	-0.56	1.06
12-Aug-95	Haze	Calm	2.39	0.48	0.52	0.53	0.84
13-Aug-95	Clear	SSE-5		0.54	0.93	1.09	1.53
14-Aug-95	Cear	SW-5	1.70	0.35	1.48	1.07	2.15
15-Aug-95	Clear	SW-6	1.55	0.27	0.76	-1.23	1.51
16-Aug-95	Clear	S-5	2.26	0.43	-0.88	-0.93	1.53
17-Aug-95	Clear	SE-4	2.23	0.55	-0.58	1.18	2.01
18-Aug-95	Clear	Vrbl-4	2.00	0.40	0.72	-1.13	1.74
19-Aug-95	Clear	Calm	1.48	0.50	0.61	-0.39	0.76
20-Aug-95	Cldy	Vrbl-3	0.47	0.51	0.68	-0.69	1.27
21-Aug-95	Cldy-Fog	NE-8	1.00	0.27	-0.66	1.23	2.43
22-Aug-95	Haze	NE-10	1.20	0.33	0.86	0.95	1.79
23-Aug-95							
24-Aug-95	PtlyCldy	ENE-6	1.77	0.27	-1.29	0.83	2.19
25-Aug-95							
26-Aug-95	PtlyCldy	NE-5	0.98	0.26	1.46	-0.89	2.35
27-Aug-95							
28-Aug-95	Clear	NE-7	1.41	0.31	0.68	-1.39	1.97
29-Aug-95	Clear	E-6	1.84	0.45	1.32	0.64	2.11

A cross wind or head wind change of ± 1 m/s was common in the 10 minute period with the maximum change from one 10 minute period to the next of 0.76 to -2.54 m/s (1135-1145 UTC, v-component 9 August). In other words, it would be possible to experience a change from a head wind to tail wind or positive to negative cross wind of 6 kts in a little over 10 minutes during the morning transition. This, of course, presumes the absence of any thunderstorm or frontal wind shear and in relatively light wind situations during the 3 week period in August 1995 at Memphis. When the winds are very light (less than 2 m/s), directions can nearly reverse in minutes. Maximum ten minute change observed was 168 degrees at 30 m on August 12. The average 2 hour temperature change during clear, light wind (less than 8 kts) conditions was 1.93 C compared to the change of 1.21 C during cloudy-windy days.

During the evening transition, the atmospheric boundary layer changes more slowly when the sun sets. Average cooling over two hours under clear, calm conditions was -1.2 C. This is only true in the absence of thunderstorm gust fronts or air mass changes from frontal passages. The effects of thunderstorm outflows show up clearly in Table 3. On the 9th, 17th and 19th of

Table 3. Changes in temperature and wind at 30 meters altitude during the evening transition.

Date	Clouds	Wind (Knts)	2 hour Temp. (C)	Maximum			
				10 min.			20 min.
				Temp. (C)	U (m/s)	V (m/s)	U or V (m/s)
6-Aug-95	PtlyCldy	SE-6	-1.98	-0.47	-1.03	1.67	2.49
7-Aug-95							
8-Aug-95	PtlyCldy	S-5	-2.62	-1.92	-1.54	1.03	2.85
9-Aug-95	Tstm	E 18-24	0.10	-0.55	5.72	3.20	9.94
10-Aug-95	LtRain	N-5	-1.93	2.60	2.06	-1.63	2.62
11-Aug-95	PtlyCldy	Vrbl-5	-3.10	-2.48	-4.77	3.59	5.43
12-Aug-95	PtlyCldy	W-3		-0.94	-1.80	1.50	2.52
13-Aug-95	Clear	SSE-5	-0.75	0.24	-0.58	0.99	1.31
14-Aug-95	Clear	S-5	-1.20	-0.25	-0.79	-1.16	1.47
15-Aug-95	Clear	SW-3		-0.21	-0.86	0.33	1.03
16-Aug-95	Clear	S-5	-1.90	-0.56	1.10	0.66	1.55
17-Aug-95	Tstm	S-5	1.20	-2.02	-0.60	-1.43	2.64
18-Aug-95	Clear	SE-6	-0.95	-0.25	0.67	-1.20	1.52
19-Aug-95	PtlyCldy	NE 12-18	-2.86	1.60	-1.85	-3.64	4.94
20-Aug-95	PtlyCldy	N-12	-1.91	-0.22	-2.13	-2.06	4.13
21-Aug-95	PtlyCldy	NE-8	-0.62	-0.29	-1.17	2.25	3.64
22-Aug-95	Clear	NE-10					
23-Aug-95	Clear	NE-10	-2.01	-0.52	0.89	1.20	1.94
24-Aug-95	Clear	ENE-6	-1.21	-0.26	1.25	0.76	1.84
25-Aug-95	Clear	NE-8	-1.54	-0.36	1.51	1.22	2.29
26-Aug-95	Clear	NE-10					
27-Aug-95	PtlyCldy	NE-8	-0.56	-0.13	1.45	1.69	3.06
28-Aug-95	Clear	NE-10	-1.50	-0.27	0.91	1.68	2.96
29-Aug-95	PtlyCldy	E-6					

August, thunderstorms produced significant changes. The thunderstorm did not have to be over the airport either. On 9 August the temperature dropped 7 C just prior to the beginning of our sunset transition at about 2330, but the effects were captured in the wind which continued to blow 9 to 11 m/s from the thunderstorm east of the airport until 0015 (10 August UTC). This appears in the statistics as a large 10 minute change in u and v for the first two ten minute periods. The most significant changes on 17 August also took place before 2347. However, on the 19th a thunderstorm outflow produced south wind gusts to 22 m/s at 2130 with cooling of 9 C. Another gust front from a thunderstorm nearby produced 9 m/s winds from the NE at 0050 (20 August UTC). These appear in the 10 minute statistics 0024-0034 as a 180 degree wind direction change at 5 m. At this time of late afternoon in the summer wind shifts from active thunderstorms, even from dissipated thunderstorms as far away as 100 km, are not uncommon.

d. Vertical variation from combined sensor data. The maximum vertical temperature changes (lapse rates) were discussed in the context of atmospheric stability in paragraph 3b. In

the data shown in Appendix 2, changes in virtual potential temperature² and winds were calculated for every day that data were available in August 1995 at 10, 30, 100, and 300 m during wake vortex measurements. Largest changes are summarized in Table 4. The sign

Table 4. Maximum vertical change in temperature and winds for selected times and altitudes.

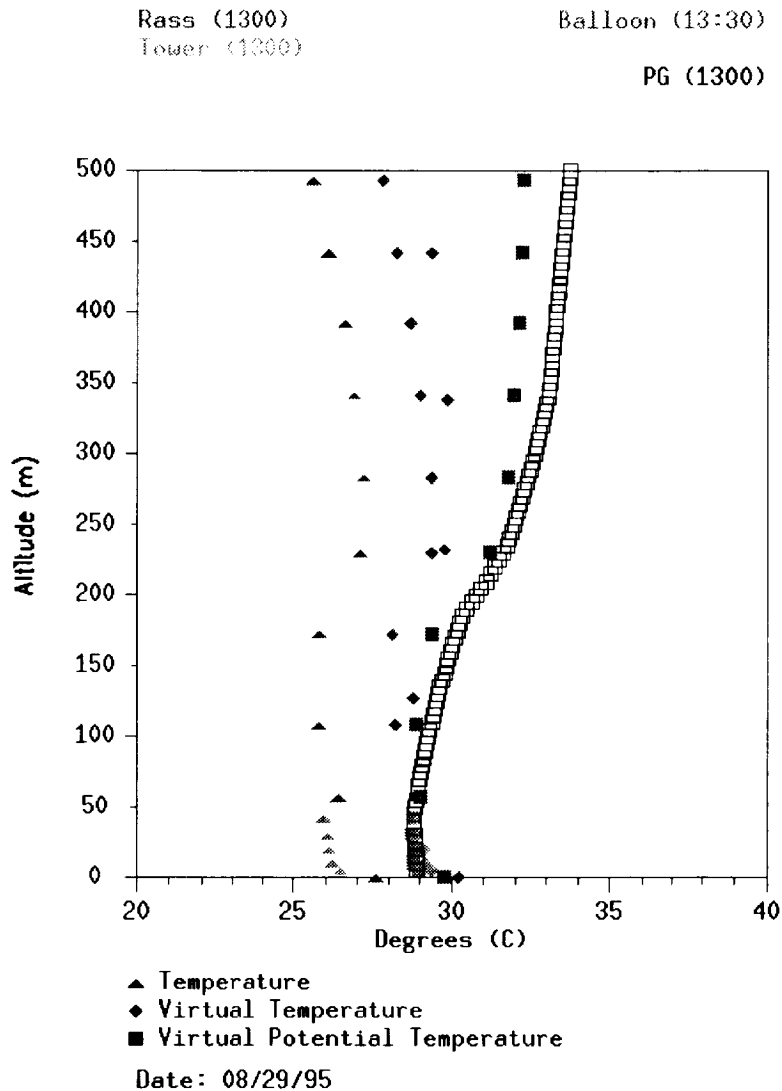
Time	Virtual Pot. Temp.		U		V	
	100-10 m	300-10 m	100-10 m	300-10 m	100-10 m	300-10 m
(UTC)	(C)	(C)	(m/s)	(m/s)	(m/s)	(m/s)
0:00	-0.90	1.41	-1.33	2.10	2.39	4.38
4:00	3.19	3.65	-5.61	-8.71	2.48	-3.52
13:00	1.55	3.73	-3.75	-3.63	0.74	-3.52
18:00	-2.15	-2.33	1.21	1.45	-2.15	-2.33
	100-30 m	300-30 m	100-30 m	300-30 m	100-30 m	300-30 m
	(C)	(C)	(m/s)	(m/s)	(m/s)	(m/s)
0:00	-0.93	1.38	-0.99	1.97	2.01	4.00
4:00	1.56	3.21	-4.37	-7.47	-1.69	-3.07
13:00	1.50	3.78	-2.65	-3.84	0.67	-3.49
18:00	-1.34	-1.39	1.45	1.69	-1.13	-2.01

convention was to subtract the lower level temperature from the next higher level such as 100 m temperature - 10 m temperature. The largest virtual potential temperature change between 10 and 300 m was 3.73 C that occurred at 1300 UTC on 29 August. Temperature plots at this time are shown in Figure 3. Solar heating has already occurred in the lowest 20 m by 1300 UTC.

Of special significance is the wind shear showing at 0400 UTC both on 24 and 25 August. The change in head wind component (u on this day) was nearly 9 m/s in 300 m on 24 August from Appendix 2. On August 25 when runway 27 was in use, there was a 7 m/s cross wind (u) change between 10 and 300 m. This shear is also shown in Figure 4. Note at the surface there was a cross wind of 1.5 m/s and at 300 m, 8.5 m/s. The head wind shear was less than half this value. There was evidence from OV-10 data that the combined sensor profiles may have underestimated the peak wind between 150 and 300 m in which case shears would have been larger than estimated from the profiles near the altitude of the peak wind. As discussed earlier these shears are not uncommon due to the effects of surface roughness and nocturnal inversions. One can see the veering of winds with height from the positive signs in the wind direction change column of Appendix 2. For all the late night periods (0400 UTC) winds turned with height in a clockwise direction. For a given time and assuming the runway was chosen in the direction of the mean wind, this means that vortices could experience a cross wind from one side at 300 m and from the opposite side at 30 m and below. Not shown in this data was the fact that wind directions also changed in a clockwise sense with time especially during the late night periods on 15 and 16 August. Some of this change appears as increasing wind directions during the first 20 minutes after sunrise on these two mornings.

² The virtual potential temperature includes the effects of water vapor on air density and of adiabatic processes. A positive change with height is a less rapid decrease with height than the adiabatic rate of 1 C per 100 m.

Multiplatform Temperature Comparison



**Figure 3. Plot of temperature vs. height from a variety of sensors
August 29, 1995 at 1300 UTC.**

e. Observed behavior in vertical variation from OV-10 approaches. OV-10 data confirms the behavior reported above. Appendix 3 lists temperature and wind for all approaches made by the OV-10 coincident with the times in Appendix 2. There were four time periods: just after sunrise, afternoon, near sunset and early morning prior to sunrise. As expected early morning and near sunrise flights confirm the temperature increase with height and wind speeds

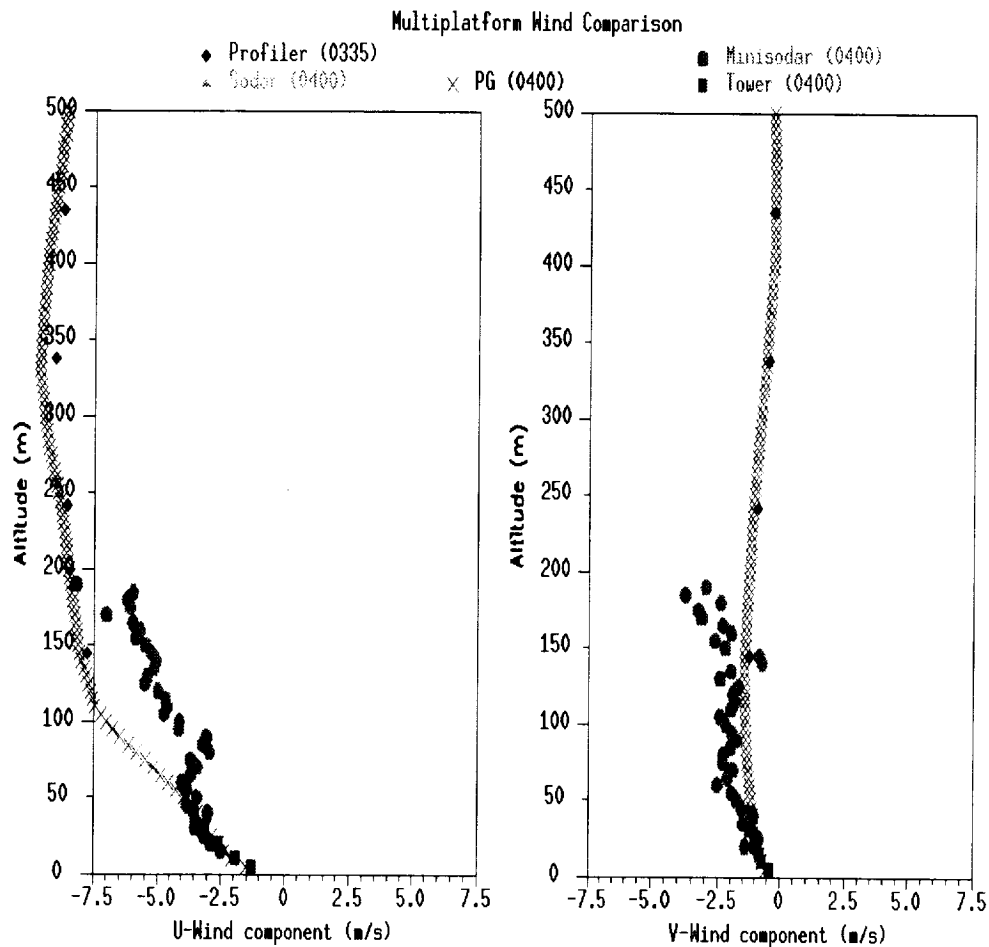


Figure 4. Plot of wind vs. height from a variety of sensors on August 15, 1995 at 400 UTC.

increasing with height, although there were exceptions during very weak pressure gradients on 12, 16, and 19 August. Of interest is the 9 m/s crosswind shear at 0423 UTC on 23 August between 30 and 300 m. This was a similar day to 24 August when the 9 m/s shear was reported in paragraph 3d above from the combined sensor data.

The OV-10 also measured some uniform changes in wind directions and speeds with distance traversed during many of the flights at constant altitudes parallel to the runways. For example, on 16 August, winds backed 10 degrees (195 deg. to 185 deg.) with distance traversed from South to North along runway 36 at 150 m as shown in Figure 5. Similarly, at 150 m along runway 27 the change from east to west was about 10 degrees counterclockwise (Fig. 6). These changes are over distances of only about 3000 meters.

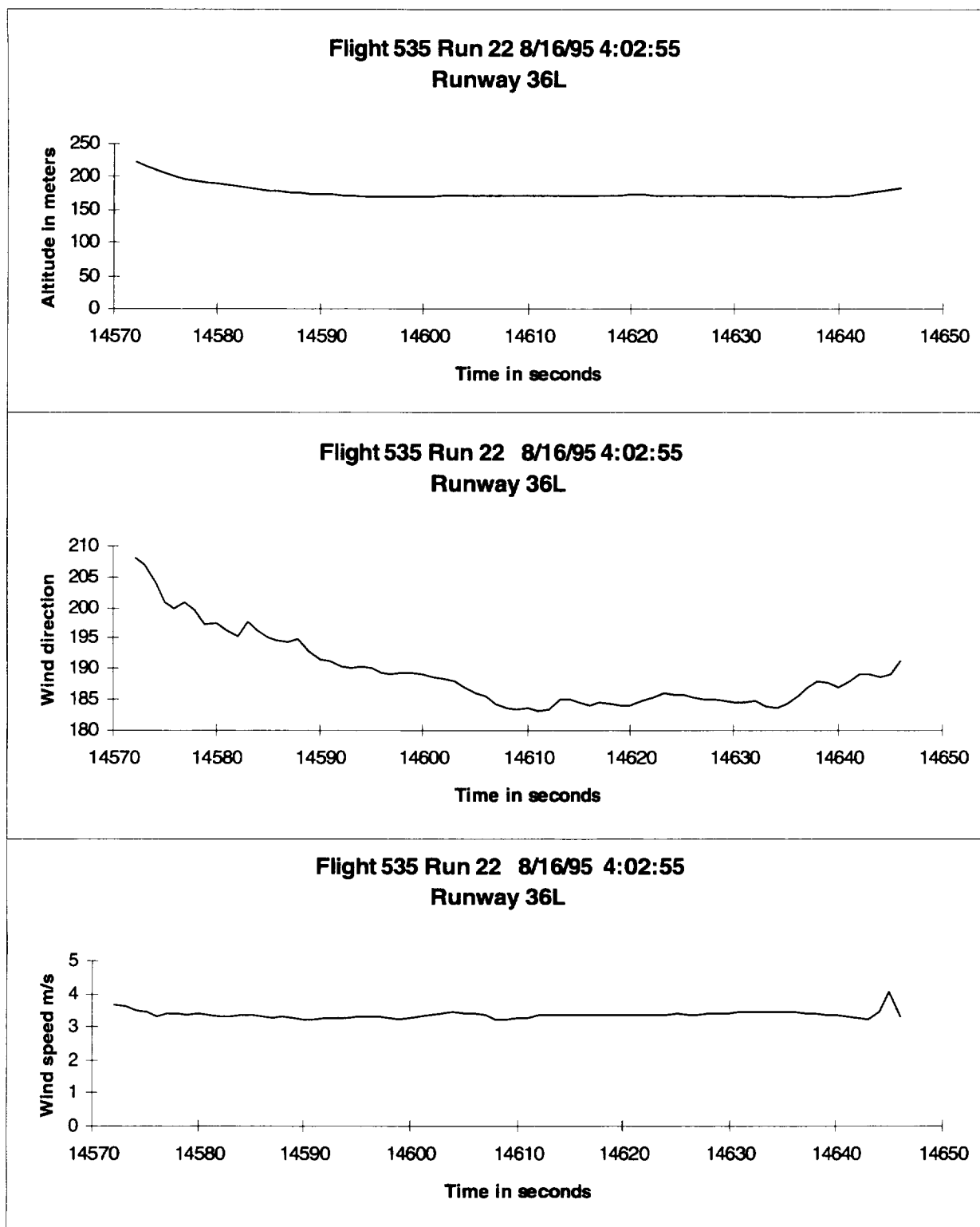


Figure 5. Altitude and winds from NASA OV-10 aircraft level pass over runway 36L August 16, 1995 at 403 UTC. The x-axis is time in seconds since midnight UTC.

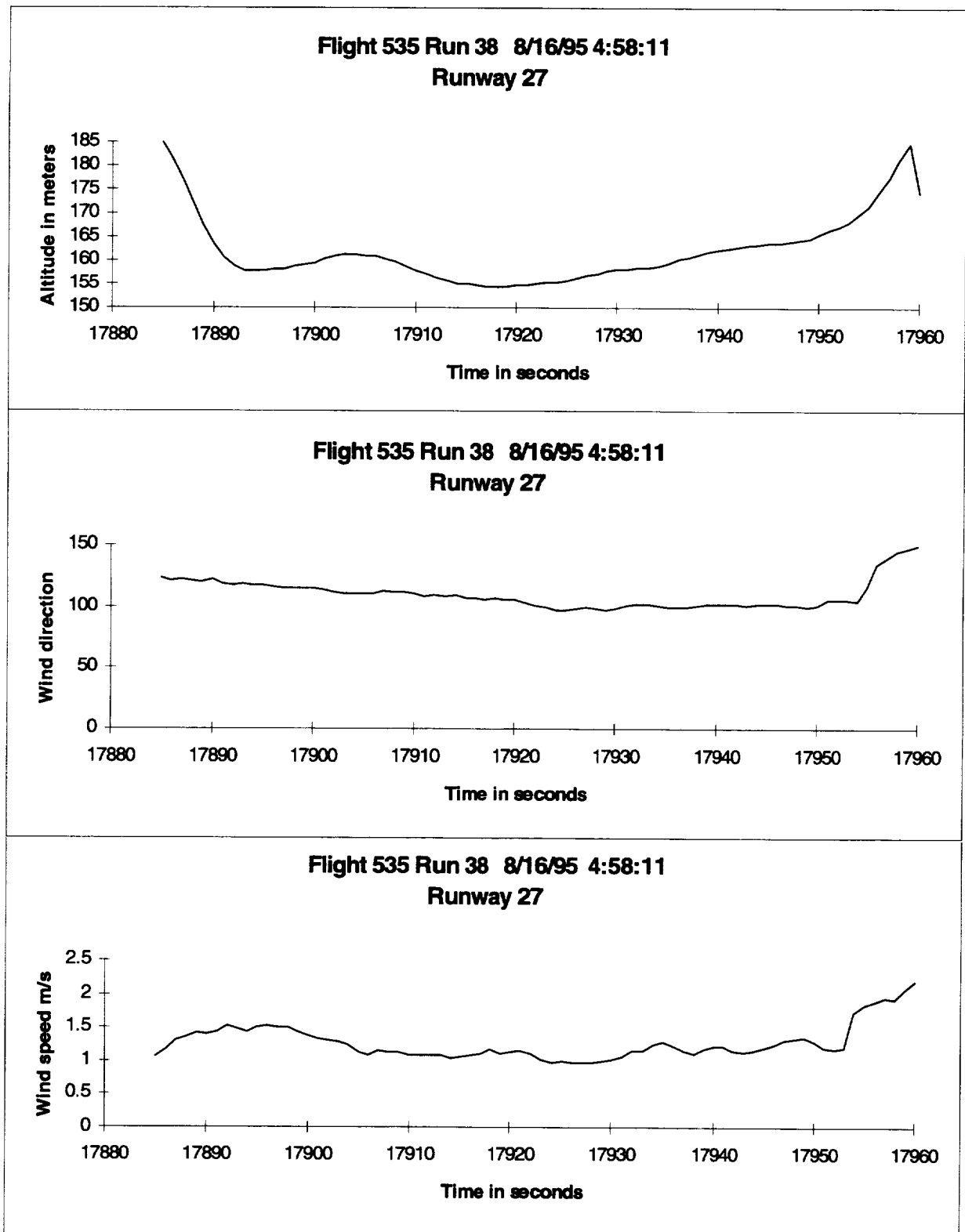


Figure 6. Altitude and winds from NASA OV-10 aircraft level pass over runway 27 August 16, 1995 at 458 UTC. The x-axis is time in seconds since midnight UTC.

f. Convective eddies. Eddies are common on most sunny afternoons. These are normal responses of the atmosphere to solar heating and convection. Warm air rises and is replaced by surrounding air near the surface. During Memphis in August eddies were evident in the tower wind data on 5 days and 14 different time periods. Table 5 lists the dates, times and average duration of these eddies during times of wake vortex collections. There were undoubtedly eddies on other afternoons as well. Figure 7 is a plot of tower wind vectors at one-minute intervals for 28 August beginning at 1700 UTC. The eddy from 1712 to 1720 is readily apparent. Notice that the onset is 1 minute or less as is the end of the eddy.

Table 5. Times of eddy motion observed in tower wind data during the Memphis 1995 deployment.

Date	Time UTC	Average Period minutes	Wind Dir/Spd m/s
8-Aug-95	1346-1503	2	SW / 2.5
8-Aug-95	1708-1718	8	SW / 2.5
18-Aug-95	1240-1309	8	SE / 1.0
18-Aug-95	1707-1802	7	SE / 1.0
19-Aug-95	1500-1700	5	N / 1.0
19-Aug-95	2208	12	SW / 2.0
26-Aug-95	1234-1312	6	N / 3.0
26-Aug-95	1819	6	NW / 5.0
28-Aug-95	1632-1730	7	N / 2.0
29-Aug-95	1741-1800	8	NE / 2.0

4. Limitations

There were limitations because of the small period of record primarily, but also due to uncertainty in some of the measurements. A complete discussion of sensor limitations is presented in reference 10. Aircraft measurements of winds were off in absolute value. Combined sensor profiles were determined manually from a variety of different sensors sampling at different locations and in different averaging periods. Sodar data was mostly not included because of problems with RASS interference and high noise. Winds at 300 m were from a 915 MHz Radian Corporation profiler (Lap-3000) averaged over 25 minute periods. Small-scale fluctuations that could significantly contribute to vortex behavior were not adequately resolved above the tower. Similarly, temperatures from RASS may not reveal the true detailed structure of the thermal field at certain times of day since the measurements were at about 100 m vertical resolution and repeated only every 30 minutes.

5. Summary

Strong stable lapse rates were observed and are common just before sunrise, and strong low level unstable lapse rates are normal on sunny afternoons. The strongest stable lapse rate was about 2.0 C per 100 m and largest unstable rate was about -3.0 C/100 m. These observed vertical temperature gradients are not unusually large. Strong wind shears were observed and can exist near the surface on practically any day when pressure gradients aloft are strong due to effects of surface friction. Largest change observed was 2.0 m/s in 100 m altitude. Winds changed

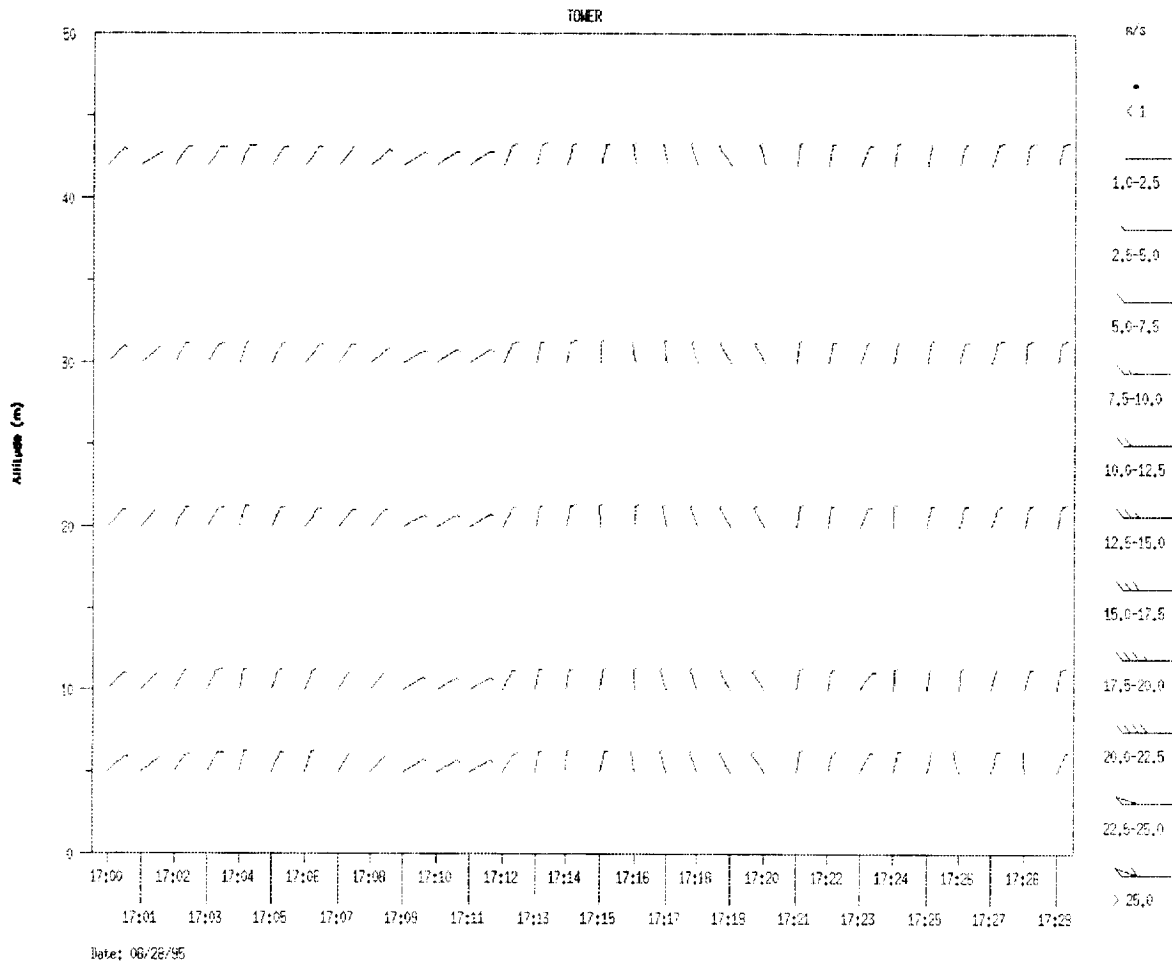


Figure 7. Tower winds August 28, 1995 1700 to 1730 UTC.

direction by 10 degrees or more over 3 km distance at 150 m altitude. In the low levels of the atmosphere (below about 100 m) eddies changed wind directions 40 degrees or more on sunny afternoons and during morning heating. Also, since runway alignment is chosen with respect to the mean wind, the normal tendency of winds to change directions with height produced cross winds that changed from right to left or vice versa in descending from 300 m to 30 m. The wake vortex can therefore change direction as it descends from both the mean wind and wind shears that can occur. Finally, thunderstorms produced very rapid changes in temperatures and winds throughout the boundary layer even when the thunderstorms were not visible at the airport or after they have dissipated.

6. Conclusions

It is not appropriate to draw general conclusions about atmospheric boundary layer behavior from observations on just 22 days in one month at one place. Nevertheless, when put into the context of state of knowledge of boundary layer processes, useful information can be extracted.

There are several fundamental questions needing answers. First, how rapidly does the atmosphere change in the vertical and with time/space? In other words can sensors near the surface adequately characterize conditions at vortex altitudes? Secondly, can sensors at different locations around the airport adequately characterize important conditions on approach (or departure) to the active runways? Related questions are how well does persistence work as a forecast tool and how can we predict observed changes?

Quantitative answers are not yet possible because "adequately" needs to be defined and related to a quantified wake vortex hazard.

The first two questions can only be qualitatively answered from the limited data presented. Based on measured and known variability of the atmospheric boundary layer, there will be times when winds and temperatures change significantly with time, distance, and in the vertical. Some quantification has been provided for this data set. The morning and evening transition periods are times of large changes in both space and time. The air began to warm on the average about 30 minutes after sunrise at 5 meters above the surface, 45 minutes after sunrise at 30 m and 70 minutes at 42 m altitude. During these transition periods, wind shears can be large and change rapidly with time and height. It is clear that persistence is not an appropriate forecast tool, so how can these observed changes be predicted?

Atmospheric boundary layer behavior is a complex function of terrain and soil characteristics, and the vertical fluxes of heat, momentum and moisture. More is known about properties very close to the ground and during neutral stratification than for highly stable or unstable conditions. Some successes have been achieved over flat uniform terrain in relating fluxes to vertical gradients (ref. 6). Some relatively simple one-dimensional boundary layer models such as Blackadar's model in reference 5 appear to characterize some of the significant changes in boundary layer properties discussed. Another one dimensional model (ref. 11) will be tested in the next field deployment. More sophisticated 2 and 3 dimensional models (ref. 12) offer promise in the near-term as well and are being pursued as part of AVOSS. It is possible that models with appropriate physics, initialization and testing will be able to do a reasonable job at predicting many of the vertical and time changes of meteorological properties of the boundary layer. A critical question is the level of detail or resolution required to accurately characterize the vortex hazard so that the related question about the details in the initialization process and resolution possible with atmospheric models can be addressed.

A short-term reasonably accurate prediction of the occurrence of thunderstorms and outflow boundaries can be expected. Mid-afternoon convection with associated convergence-divergence fields is also known to occur in the absence of strong pressure gradient forcing, but predicting magnitudes and timing could be a problem. One clue to their onset might be in the variance of one second tower observations over averages of several minutes. These data were not available for this investigation but will be provided during subsequent field measurements. Therefore, if one discards the effects of thunderstorms, and wind variability when wind speeds are less than 5 m/s (10 kts), and transition period temperature changes (assume they can be modeled), then the most significant remaining boundary layer property potentially contributing to wake vortex behavior is vertical and horizontal wind shear. Models may have difficulty determining the

altitude and magnitude of the peak wind below 500 m and, therefore, predicting the shear. Eddies can also be active when surface winds are 5 m/s or greater and especially when terrain induced wave motion occurs. These will be very difficult to model, but the vortex hazard during strong winds is also reduced because of horizontal transport and decay effects.

The wake hazard needs to be quantified and more research is needed on the effects of wind shear and strong thermal gradients on wake vortex behavior. Once the hazard is quantified, only then will it be possible to address in more detail the problem of predictability of atmospheric boundary layer properties pertinent to vortex hazards.

It is essential for wake vortex research to continue. The next field deployment will add significantly to answers to these important questions.

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Appendix 1

Time changes of meteorological variables during sunrise and sunset transition periods in August 1995 at Memphis International Airport.

SUNRISE 80795													
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.26	-0.16	0.12	0.12
80795	11:13	5	0.10	-0.40	0.33	0.40	0.11	0.32	humidity	0.70	-1.40	-0.41	0.59
80795	11:23	5	-0.16	0.70	-0.68	-2.10	-0.29	-0.63	wind	1.54	-0.68	0.07	0.69
80795	11:33	5	-0.08	0.30	-0.27	3.00	0.10	-0.31	direction	12.70	-11.60	1.07	6.55
80795	11:43	5	0.12	-0.30	0.50	0.10	0.14	0.48	u	0.88	-1.16	0.10	0.57
80795	11:53	5	0.07	0.00	-0.67	-3.10	-0.33	-0.60	v	1.39	-0.82	0.04	0.68
80795	12:03	5	0.15	-0.60	1.27	-0.40	0.24	1.24					
80795	12:13	5	0.26	-0.80	0.03	10.20	0.72	-0.18					
80795	12:23	5	0.20	-0.40	0.04	-6.60	-0.45	0.19					
80795	12:33	5	0.23	-0.40	-0.27	0.90	-0.01	-0.28					
80795	12:43	5	0.23	-1.40	1.54	3.20	0.72	1.39					
80795	12:53	5	0.22	-1.10	-0.06	7.20	0.61	-0.33					
80795	13:03	5	0.09	-1.00	-0.22	12.70	0.88	-0.82					
80795	13:13	5	0.13	0.10	-0.60	-11.60	-1.16	0.05					
1 hour differences													
80795	12:13	5	0.36	-0.70	0.18	7.70	0.58	0.00					
80795	13:13	5	1.10	-4.20	0.43	5.80	0.59	0.20					
2 hour differences													
80795	13:13	5	1.46	-4.90	0.61	13.50	1.17	0.20					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.25	-0.12	0.10	0.11
80795	11:13	30	0.04	-0.20	0.31	4.50	0.47	0.22	humidity	0.60	-1.10	-0.30	0.50
80795	11:23	30	-0.02	0.20	-0.44	1.90	0.04	-0.47	wind	1.11	-1.06	0.01	0.52
80795	11:33	30	-0.12	0.60	0.32	1.40	0.21	0.26	direction	16.00	-2.60	2.23	5.08
80795	11:43	30	-0.01	0.10	0.02	-2.60	-0.22	0.09	u	1.29	-0.86	0.18	0.56
80795	11:53	30	0.06	-0.10	-0.25	-2.40	-0.27	-0.19	v	0.79	-1.26	-0.07	0.52
80795	12:03	30	0.13	-0.20	0.56	3.10	0.42	0.47					
80795	12:13	30	0.25	-0.90	-0.10	0.60	0.03	-0.11					
80795	12:23	30	0.14	-0.20	-0.12	4.90	0.39	-0.27					
80795	12:33	30	0.20	-0.40	-0.05	-2.20	-0.21	0.03					
80795	12:43	30	0.23	-0.90	1.11	6.00	0.99	0.79					
80795	12:53	30	0.20	-1.10	0.17	0.00	0.08	0.15					
80795	13:03	30	0.12	-0.80	-0.33	16.00	1.29	-1.26					
80795	13:13	30	0.05	0.00	-1.06	-2.20	-0.86	-0.66					
1 hour differences													
80795	12:13	30	0.29	-0.30	0.11	2.00	0.21	0.05					
80795	13:13	30	0.94	-3.40	-0.28	22.50	1.68	-1.22					
2 hour differences													
80795	13:13	30	1.23	-3.70	-0.17	24.50	1.89	-1.17					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.00	0.00	0.00	0.00
80795	11:13	44	0.00	-0.20	0.25	5.50	0.59	0.14	humidity	0.80	-1.00	-0.27	0.53
80795	11:23	44	0.00	0.10	-0.12	4.00	0.35	-0.22	wind	0.52	-1.36	-0.03	0.45
80795	11:33	44	0.00	0.80	0.19	-1.20	-0.06	0.22	direction	13.40	-3.10	2.20	4.83
80795	11:43	44	0.00	0.20	-0.14	-1.90	-0.22	-0.09	u	1.34	-1.04	0.18	0.61
80795	11:53	44	0.00	-0.30	-0.13	-2.80	-0.30	-0.06	v	0.42	-0.92	-0.11	0.35
80795	12:03	44	0.00	-0.10	0.52	3.50	0.47	0.42					
80795	12:13	44	0.00	-0.70	-0.07	1.40	0.12	-0.11					
80795	12:23	44	0.00	-0.20	0.08	3.70	0.40	-0.05					
80795	12:33	44	0.00	-0.50	-0.05	-3.10	-0.33	0.06					
80795	12:43	44	0.00	-0.80	0.38	7.70	0.93	0.05					
80795	12:53	44	0.00	-1.00	-0.14	0.90	0.03	-0.17					
80795	13:03	44	0.00	-1.00	0.16	13.40	1.34	-0.67					
80795	13:13	44	0.00	0.20	-1.36	-2.50	-1.04	-0.92					
1 hour differences													
80795	12:13	44	0.00	0.00	0.25	3.00	0.36	0.16					
80795	13:13	44	0.00	-3.30	-0.93	20.10	1.33	-1.70					
2 hour differences													
80795	13:13	44	0.00	-3.30	-0.68	23.10	1.69	-1.54					

SUNRISE 80895
no data available

SUNRISE 80995

date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
80995	11:15	5	-0.10	-0.30	0.35	20.00	0.37	0.70	temp	0.31	-0.10	0.13	0.16
80995	11:25	5	-0.10	1.30	-0.95	16.80	0.77	-0.75	humidity	1.30	-1.90	-0.47	1.03
80995	11:35	5	0.19	-1.40	0.79	-18.30	-0.75	0.58	wind	0.82	-0.95	0.02	0.56
80995	11:45	5	-0.09	0.90	-0.08	-53.60	-1.01	-1.52	direction	41.70	-53.60	4.12	26.76
80995	11:55	5	0.28	-1.90	-0.14	22.20	0.39	0.64	u	1.16	-1.01	0.12	0.75
80995	12:05	5	-0.02	0.40	-0.45	41.70	1.16	0.38	v	0.70	-1.52	0.06	0.68
80995	12:15	5	0.17	-0.10	0.26	-41.80	-1.00	-0.48					
80995	12:25	5	0.31	-1.90	0.82	6.30	-0.55	0.65					
80995	12:35	5	0.28	-1.10	0.45	3.20	-0.26	0.40					
80995	12:45	5	0.10	0.50	-0.86	9.10	0.89	-0.33					
80995	12:55	5	0.23	-0.70	-0.13	11.50	0.40	0.12					
80995	13:05	5	0.10	-0.70	0.38	15.60	0.40	0.56					
80995	13:15	5	0.31	-1.10	-0.22	20.90	0.81	-0.18					
1 hour differences													
80995	12:15	5	0.43	-0.80	-0.57	-33.00	-0.44	-1.15					
80995	13:15	5	1.33	-5.00	0.44	66.60	1.69	1.22					
2 hour differences													
80995	13:15	5	1.76	-5.80	-0.13	33.60	1.25	0.07					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
80995	11:15	30	0.21	-1.60	0.14	30.50	1.14	1.38	temp	0.61	-0.69	0.09	0.36
80995	11:25	30	-0.62	3.60	-0.25	4.30	0.34	-0.10	humidity	4.10	-3.20	-0.14	2.07
80995	11:35	30	0.61	-3.20	0.89	-0.90	-0.45	0.76	wind	0.89	-1.09	-0.08	0.55
80995	11:45	30	-0.69	4.10	-1.09	-41.20	-0.93	-2.54	direction	32.00	-41.20	4.88	21.01
80995	11:55	30	0.27	-1.40	-0.57	10.20	0.73	0.18	u	1.15	-0.93	0.23	0.73
80995	12:05	30	0.08	-0.30	-0.14	26.00	0.85	0.66	v	1.38	-2.54	0.06	0.98
80995	12:15	30	-0.06	1.20	0.04	-26.20	-0.77	-0.72					
80995	12:25	30	0.32	-1.80	0.81	9.00	-0.40	0.83					
80995	12:35	30	0.25	-0.70	0.12	-6.30	-0.31	-0.21					
80995	12:45	30	0.11	0.10	-0.54	15.10	0.93	0.23					
80995	12:55	30	0.19	0.00	-0.37	0.00	0.24	-0.28					
80995	13:05	30	0.25	-1.00	0.25	32.00	1.15	0.79					
80995	13:15	30	0.21	-0.80	-0.28	11.00	0.49	-0.25					
1 hour differences													
80995	12:15	30	-0.41	4.00	-1.12	-27.80	-0.23	-1.76					
80995	13:15	30	1.33	-4.20	-0.01	60.80	2.10	1.11					
2 hour differences													
80995	13:15	30	0.92	-0.20	-1.13	33.00	1.87	-0.65					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
80995	11:15	44	0.00	-2.50	-0.54	38.50	2.11	1.26	temp	0.00	0.00	0.00	0.00
80995	11:25	44	0.00	3.30	0.63	-6.50	-0.66	0.37	humidity	5.80	-3.90	-0.06	2.49
80995	11:35	44	0.00	-3.90	0.09	11.70	0.72	0.42	wind	0.77	-0.88	-0.11	0.49
80995	11:45	44	0.00	5.80	-0.65	-45.90	-1.81	-2.39	direction	38.50	-45.90	4.55	22.84
80995	11:55	44	0.00	-0.80	-0.56	7.40	0.69	0.08	u	2.11	-1.81	0.26	1.04
80995	12:05	44	0.00	-0.20	-0.18	21.90	0.86	0.64	v	1.26	-2.39	0.05	0.97
80995	12:15	44	0.00	1.40	0.15	-24.40	-0.90	-0.76					
80995	12:25	44	0.00	-2.00	0.77	9.50	-0.32	0.88					
80995	12:35	44	0.00	-0.30	0.04	-7.60	-0.32	-0.36					
80995	12:45	44	0.00	-0.60	-0.17	17.70	0.86	0.71					
80995	12:55	44	0.00	0.60	-0.88	-0.50	0.54	-0.69					
80995	13:05	44	0.00	-0.70	0.20	34.00	1.38	0.80					
80995	13:15	44	0.00	-0.90	-0.31	3.30	0.18	-0.29					
1 hour differences													
80995	12:15	44	0.00	5.60	-0.52	-35.80	-1.10	-1.64					
80995	13:15	44	0.00	-3.90	-0.35	56.40	2.32	1.05					
2 hour differences													
80995	13:15	44	0.00	1.70	-0.87	20.60	1.22	-0.59					

SUNRISE 81095

date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81095	11:15	5	0.13	-0.70	0.31	11.20	-0.18	0.28	temp	0.53	-0.16	0.20	0.20
81095	11:25	5	-0.16	0.20	0.85	-4.30	-0.74	0.44	humidity	0.40	-1.80	-0.55	0.68
81095	11:35	5	0.01	0.00	-0.37	7.30	0.41	-0.08	wind	0.85	-0.75	0.10	0.56
81095	11:45	5	-0.06	0.40	-0.36	21.80	0.56	-0.03	direction	69.70	-65.90	6.05	31.36
81095	11:55	5	0.17	-0.20	-0.75	-15.20	0.28	-0.70	u	0.85	-1.24	0.08	0.65
81095	12:05	5	0.23	-0.50	0.79	-8.30	-0.62	0.49	v	0.83	-0.70	0.11	0.45
81095	12:15	5	0.30	-1.40	0.45	8.40	-0.19	0.44					
81095	12:25	5	0.10	0.20	-0.61	34.20	0.85	-0.26					
81095	12:35	5	0.36	-0.60	-0.42	69.70	0.47	-0.64					
81095	12:45	5	0.53	-1.40	0.84	-2.80	0.72	0.44					
81095	12:55	5	0.18	-1.80	0.21	-65.90	-1.24	0.83					
81095	13:05	5	0.30	-0.70	0.19	28.60	0.79	0.07					
81095	13:15	5	0.49	-0.60	0.16	-6.10	-0.12	0.21					
1 hour differences													
81095	12:15	5	0.49	-1.50	0.61	9.70	-0.30	0.56					
81095	13:15	5	1.96	-4.90	0.37	57.70	1.47	0.65					
2 hour differences													
81095	13:15	5	2.45	-6.40	0.98	67.40	1.17	1.21					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81095	11:15	30	-0.01	-0.10	0.02	0.90	0.00	0.04	temp	0.37	-0.16	0.16	0.18
81095	11:25	30	-0.07	0.10	0.41	1.00	-0.35	0.22	humidity	0.70	-1.10	-0.38	0.59
81095	11:35	30	-0.16	0.60	0.04	6.30	0.11	0.28	wind	0.74	-0.79	-0.01	0.55
81095	11:45	30	-0.07	0.70	-0.69	15.10	0.93	0.03	direction	56.10	-53.90	6.59	24.33
81095	11:55	30	0.19	-0.30	-0.79	0.00	0.53	-0.59	u	1.30	-1.28	0.21	0.73
81095	12:05	30	0.20	-0.20	0.74	-4.80	-0.62	0.44	v	0.97	-1.08	0.08	0.51
81095	12:15	30	0.22	-1.10	0.61	7.50	-0.19	0.65					
81095	12:25	30	0.19	-0.50	-0.71	28.70	1.30	-0.16					
81095	12:35	30	0.31	-0.80	-0.77	56.10	1.14	-1.08					
81095	12:45	30	0.37	-0.90	0.60	15.10	0.70	0.06					
81095	12:55	30	0.23	-0.70	0.10	-53.90	-1.28	0.97					
81095	13:05	30	0.32	-1.10	0.14	14.70	0.50	0.01					
81095	13:15	30	0.37	-0.60	0.14	-1.00	0.02	0.15					
1 hour differences													
81095	12:15	30	0.31	-0.20	0.32	25.10	0.41	1.03					
81095	13:15	30	1.79	-4.60	-0.50	59.70	2.38	-0.05					
2 hour differences													
81095	13:15	30	2.10	-4.80	-0.18	84.80	2.79	0.98					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81095	11:15	44	0.00	-0.20	-0.12	0.80	0.12	-0.01	temp	0.00	0.00	0.00	0.00
81095	11:25	44	0.00	0.00	0.36	3.20	-0.24	0.31	humidity	1.10	-1.20	-0.35	0.67
81095	11:35	44	0.00	1.10	-0.04	4.70	0.16	0.22	wind	1.38	-1.36	-0.07	0.73
81095	11:45	44	0.00	0.50	-0.26	19.20	0.89	0.61	direction	57.00	-53.30	6.54	24.42
81095	11:55	44	0.00	0.00	-1.36	0.30	0.86	-1.05	u	1.65	-1.64	0.27	0.91
81095	12:05	44	0.00	-0.90	1.38	-7.90	-1.17	0.80	v	0.91	-1.35	0.07	0.68
81095	12:15	44	0.00	-1.20	0.28	12.50	0.35	0.65					
81095	12:25	44	0.00	0.10	-0.77	17.10	1.11	-0.31					
81095	12:35	44	0.00	-0.60	-1.13	57.00	1.65	-1.35					
81095	12:45	44	0.00	-0.80	0.69	16.00	0.83	0.09					
81095	12:55	44	0.00	-0.90	-0.02	-53.30	-1.64	0.91					
81095	13:05	44	0.00	-0.90	-0.09	20.60	0.69	-0.25					
81095	13:15	44	0.00	-0.70	0.22	-5.20	-0.10	0.27					
1 hour differences													
81095	12:15	44	0.00	-0.50	0.36	32.00	0.85	1.54					
81095	13:15	44	0.00	-3.80	-1.10	52.20	2.54	-0.64					
2 hour differences													
81095	13:15	44	0.00	-4.30	-0.74	84.20	3.39	0.90					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81195	11:16	5	-0.04	0.20	-0.04	63.50	0.21	0.13	temp	0.60	-0.04	0.24	0.23
81195	11:26	5	-0.01	-0.20	0.64	-8.20	-0.21	0.61	humidity	0.20	-4.10	-1.19	1.45
81195	11:36	5	-0.01	0.00	0.16	4.90	0.04	0.17	wind	0.64	-0.43	0.13	0.35
81195	11:46	5	0.03	-0.10	-0.43	9.40	0.18	-0.41	direction	63.50	-13.10	9.78	20.94
81195	11:56	5	0.15	-0.40	0.52	-5.80	-0.13	0.51	u	0.85	-0.21	0.14	0.30
81195	12:06	5	0.16	0.10	-0.29	-13.10	-0.14	-0.33	v	0.61	-0.41	0.08	0.36
81195	12:16	5	0.60	-2.30	0.58	34.20	0.61	0.59					
81195	12:26	5	0.24	-0.20	-0.07	5.70	0.11	-0.10					
81195	12:36	5	0.51	-2.40	0.07	-2.70	-0.04	0.08					
81195	12:46	5	0.55	-2.50	-0.10	2.30	0.02	-0.11					
81195	12:56	5	0.44	-4.10	0.48	4.00	0.27	0.41					
81195	13:06	5	0.33	-0.60	-0.12	4.00	0.06	-0.15					
81195	13:16	5	0.22	-3.00	0.28	29.00	0.85	-0.39					
1 hour differences													
81195	12:16	5	0.92	-2.90	1.18	21.40	0.35	1.14					
81195	13:16	5	2.29	-12.80	0.54	42.30	1.27	-0.26					
2 hour differences													
81195	13:16	5	3.21	-15.70	1.72	63.70	1.62	0.88					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81195	11:16	30	0.01	0.00	0.33	-0.50	0.13	0.30	temp	0.46	-0.08	0.19	0.16
81195	11:26	30	-0.08	0.40	0.24	-9.10	-0.15	0.31	humidity	0.40	-2.80	-1.02	1.02
81195	11:36	30	0.21	-0.90	0.47	-1.70	0.07	0.47	wind	0.71	-0.56	0.07	0.38
81195	11:46	30	0.12	-0.50	-0.05	8.00	0.27	-0.14	direction	17.70	-9.10	1.73	7.52
81195	11:56	30	0.23	-1.10	0.30	-3.80	-0.04	0.33	u	0.93	-0.48	0.08	0.36
81195	12:06	30	0.03	-0.30	-0.02	-3.10	-0.13	0.02	v	0.47	-0.56	0.03	0.34
81195	12:16	30	0.46	-2.80	0.47	17.70	0.93	0.09					
81195	12:26	30	0.25	-1.30	-0.43	7.80	0.03	-0.56					
81195	12:36	30	0.05	0.10	-0.19	-4.50	-0.26	-0.03					
81195	12:46	30	0.42	-1.90	-0.56	-5.80	-0.48	-0.36					
81195	12:56	30	0.27	-2.20	0.71	6.20	0.58	0.47					
81195	13:06	30	0.23	-0.40	-0.28	3.10	-0.08	-0.30					
81195	13:16	30	0.26	-2.30	-0.08	8.20	0.16	-0.26					
1 hour differences													
81195	12:16	30	0.97	-5.20	1.41	8.00	0.95	1.08					
81195	13:16	30	1.48	-8.00	-0.83	15.00	-0.05	-1.04					
2 hour differences													
81195	13:16	30	2.45	-13.20	0.58	23.00	0.90	0.04					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81195	11:16	42	-0.02	0.10	0.35	-0.80	0.08	0.34	temp	0.36	-0.07	0.16	0.16
81195	11:26	42	-0.07	0.30	0.07	-1.80	-0.05	0.09	humidity	0.50	-2.70	-0.87	1.00
81195	11:36	42	0.36	-1.60	0.40	3.90	0.29	0.33	wind	0.62	-0.69	0.02	0.35
81195	11:46	42	0.21	-0.80	0.00	10.40	0.46	-0.21	direction	15.00	-5.00	2.80	5.70
81195	11:56	42	0.28	-1.90	0.35	-5.00	-0.07	0.43	u	0.46	-0.47	0.09	0.28
81195	12:06	42	0.02	-0.50	0.04	2.20	0.13	-0.02	v	0.48	-0.52	-0.05	0.35
81195	12:16	42	0.36	-2.70	-0.04	9.40	0.42	-0.31					
81195	12:26	42	-0.01	-0.40	-0.31	3.90	-0.03	-0.37					
81195	12:36	42	-0.02	0.50	-0.27	-1.50	-0.23	-0.16					
81195	12:46	42	0.33	-1.20	-0.69	-1.40	-0.47	-0.51					
81195	12:56	42	0.15	-1.60	0.62	0.60	0.40	0.48					
81195	13:06	42	0.19	0.20	-0.17	1.50	-0.06	-0.18					
81195	13:16	42	0.27	-1.70	-0.13	15.00	0.31	-0.52					
1 hour differences													
81195	12:16	42	1.16	-7.20	0.82	19.10	1.18	0.31					
81195	13:16	42	0.91	-4.20	-0.95	18.10	-0.08	-1.26					
2 hour differences													
81195	13:16	42	2.07	-11.40	-0.13	37.20	1.10	-0.95					

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date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences													
81295	11:17	5	-0.27	1.40	0.68	-83.90	-0.18	0.68	temp	0.82	-0.27	0.26	0.31
81295	11:27	5	-0.06	-0.70	0.27	-15.10	-0.30	0.18	humidity	1.40	-2.50	-0.71	1.18
81295	11:37	5	0.34	-1.10	-0.22	-14.90	-0.06	-0.31	wind	0.68	-0.77	0.08	0.46
81295	11:47	5	-0.19	1.30	0.15	-12.10	-0.23	-0.03	direction	198.20	-212.70	-2.94	88.81
81295	11:57	5	0.12	-0.10	0.51	2.60	-0.38	0.35	u	0.62	-0.38	0.04	0.32
81295	12:07	5	0.37	-1.40	0.25	7.30	-0.05	0.31	v	0.68	-0.65	0.06	0.44
81295	12:17	5	0.29	-1.10	-0.35	19.90	0.62	0.01					
81295	12:27	5	0.45	-0.90	-0.77	20.40	0.51	-0.65					
81295	12:37	5	0.17	0.50	-0.51	198.20	0.03	-0.59					
81295	12:47	5	0.57	-1.90	0.61	-212.70	-0.20	0.66					
81295	12:57	5	0.82	-2.50	0.06	34.30	0.40	0.06					
81295	13:07	5	0.17	-1.60	0.51	-5.20	0.03	0.52					
81295	13:17	5	0.54	-1.10	-0.20	23.00	0.34	-0.35					
1 hour differences													
81295	12:17	5	0.87	-3.10	0.61	-12.30	-0.40	0.51					
81295	13:17	5	2.72	-7.50	-0.30	58.00	1.11	-0.35					
2 hour differences													
81295	13:17	5	3.59	-10.60	0.31	45.70	0.71	0.16					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences													
81295	11:17	30	-0.28	1.90	0.23	-168.20	-0.04	0.29	temp	0.48	-0.28	0.16	0.24
81295	11:27	30	0.15	-1.50	0.31	6.60	0.03	0.31	humidity	1.90	-2.00	-0.30	1.41
81295	11:37	30	0.42	-2.00	0.53	-4.70	-0.09	0.53	wind	0.53	-0.52	0.07	0.29
81295	11:47	30	0.02	0.20	0.16	-0.30	-0.02	0.16	direction	21.30	-168.20	-9.59	48.53
81295	11:57	30	0.28	-1.00	0.22	5.40	0.12	0.22	u	0.52	-0.31	0.04	0.23
81295	12:07	30	0.48	-1.90	0.22	-0.40	-0.01	0.22	v	0.53	-0.42	0.06	0.30
81295	12:17	30	-0.08	0.80	0.23	11.90	0.40	0.19					
81295	12:27	30	-0.04	0.90	-0.33	6.70	0.11	-0.37					
81295	12:37	30	-0.03	0.50	-0.26	10.80	0.15	-0.35					
81295	12:47	30	0.21	-0.30	-0.12	3.20	0.00	-0.14					
81295	12:57	30	0.33	-1.60	0.13	-17.50	-0.31	0.27					
81295	13:07	30	0.17	1.80	0.12	21.30	0.52	-0.12					
81295	13:17	30	0.48	-1.70	-0.52	0.50	-0.30	-0.42					
1 hour differences													
81295	12:17	30	1.27	-5.40	1.67	18.50	0.43	1.63					
81295	13:17	30	1.12	-0.40	-0.98	25.00	0.17	-1.13					
2 hour differences													
81295	13:17	30	2.39	-5.80	0.69	43.50	0.60	0.50					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences													
81295	11:17	42	-0.62	3.30	-0.11	43.50	0.01	-0.18	temp	0.50	-0.62	0.10	0.30
81295	11:27	42	0.27	-1.20	1.30	-76.50	-0.20	1.41	humidity	3.30	-2.00	-0.04	1.59
81295	11:37	42	0.35	-1.10	0.28	12.40	0.36	0.25	wind	1.30	-0.59	0.08	0.46
81295	11:47	42	0.17	-0.60	-0.02	2.20	0.06	-0.03	direction	43.50	-76.50	0.01	27.43
81295	11:57	42	0.43	-1.80	0.10	17.20	0.53	-0.09	u	0.53	-0.32	0.04	0.33
81295	12:07	42	0.25	-0.90	0.03	-9.00	-0.25	0.14	v	1.41	-0.57	0.07	0.49
81295	12:17	42	-0.06	1.20	0.53	4.90	0.37	0.42					
81295	12:27	42	0.05	0.10	-0.11	12.70	0.38	-0.36					
81295	12:37	42	-0.20	1.10	-0.59	5.50	-0.24	-0.57					
81295	12:47	42	-0.11	0.20	-0.16	-9.60	-0.31	0.04					
81295	12:57	42	0.19	-1.00	0.12	-13.50	-0.27	0.28					
81295	13:07	42	0.06	2.20	0.07	15.30	0.42	-0.15					
81295	13:17	42	0.50	-2.00	-0.39	-5.00	-0.32	-0.25					
1 hour differences													
81295	12:17	42	1.41	-4.40	2.22	-48.80	0.87	2.10					
81295	13:17	42	0.49	0.60	-1.06	5.40	-0.34	-1.01					
2 hour differences													
81295	13:17	42	1.90	-3.80	1.16	-43.40	0.53	1.09					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.60	-0.58	0.23	0.30
81395	11:18	5	-0.58	2.60	0.20	-21.20	-0.33	-0.25	humidity	2.60	-2.70	-0.59	1.38
81395	11:28	5	0.03	0.40	-0.91	0.70	0.88	-0.23	wind	0.86	-0.91	0.05	0.62
81395	11:38	5	0.04	0.00	0.25	35.00	-0.10	0.29	direction	67.20	-42.60	4.07	34.54
81395	11:48	5	0.54	-2.70	0.57	27.50	0.07	0.65	u	0.88	-0.45	0.05	0.39
81395	11:58	5	0.30	-1.10	-0.72	-12.80	0.09	-0.73	v	1.05	-0.73	0.07	0.57
81395	12:08	5	0.35	-1.20	0.61	-13.50	-0.44	0.45					
81395	12:18	5	0.25	-0.50	-0.11	7.20	0.15	-0.03					
81395	12:28	5	0.60	-0.30	-0.71	60.80	0.45	-0.61					
81395	12:38	5	0.50	-2.60	0.28	-42.60	-0.12	0.28					
81395	12:48	5	0.13	-0.40	0.21	67.20	0.54	-0.02					
81395	12:58	5	0.27	-1.10	0.86	-38.90	-0.08	1.05					
81395	13:08	5	0.23	-1.30	0.77	-4.40	0.04	0.78					
81395	13:18	5	0.33	0.50	-0.71	-12.10	-0.45	-0.67					
1 hour differences													
81395	12:18	5	1.51	-5.10	-0.31	44.10	0.65	0.40					
81395	13:18	5	2.06	-5.20	0.70	30.00	0.38	0.81					
2 hour differences													
81395	13:18	5	3.57	-10.30	0.39	74.10	1.03	1.21					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.54	-0.28	0.19	0.21
81395	11:18	30							humidity	2.10	-2.40	-0.30	1.15
81395	11:28	30							wind	1.17	-1.36	-0.06	0.71
81395	11:38	30							direction	26.50	-14.10	4.56	12.24
81395	11:48	30							u	0.93	-0.47	0.16	0.47
81395	11:58	30	0.11	-0.10	0.36	-4.30	-0.36	0.17	v	1.09	-1.09	-0.01	0.63
81395	12:08	30	0.15	-0.40	-0.12	11.90	0.49	0.20					
81395	12:18	30	0.54	-2.40	0.28	1.10	-0.09	0.27					
81395	12:28	30	-0.28	2.10	-1.36	13.60	0.93	-1.09					
81395	12:38	30	0.26	-0.60	-0.01	-5.50	-0.12	-0.05					
81395	12:48	30	0.26	-0.40	-0.51	26.50	0.55	-0.44					
81395	12:58	30	0.19	-0.50	1.17	10.30	0.49	1.09					
81395	13:08	30	0.19	-0.50	0.24	-14.10	-0.47	0.33					
81395	13:18	30	0.27	0.10	-0.60	1.50	0.01	-0.61					
1 hour differences													
81395	12:18	30											
81395	13:18	30	0.89	0.20	-1.07	32.30	1.39	-0.77					
2 hour differences													
81395	13:18	30											
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.58	-0.59	0.05	0.29
81395	11:18	42	-0.09	0.60	0.36	-3.90	-0.41	0.08	humidity	3.10	-2.50	0.11	1.25
81395	11:28	42	-0.20	0.90	-0.46	-0.10	0.35	-0.30	wind	0.97	-1.24	-0.07	0.64
81395	11:38	42	0.12	-0.10	0.71	7.90	-0.21	0.81	direction	29.00	-13.60	4.17	10.10
81395	11:48	42	-0.21	0.90	-0.31	4.60	0.41	-0.06	u	1.00	-0.48	0.19	0.46
81395	11:58	42	-0.07	0.50	0.15	-1.20	-0.15	0.08	v	0.93	-1.05	0.00	0.56
81395	12:08	42	0.14	-0.70	-0.14	7.00	0.41	0.12					
81395	12:18	42	0.58	-2.50	-0.12	-1.00	0.02	-0.13					
81395	12:28	42	-0.59	3.10	-0.98	11.50	0.92	-0.62					
81395	12:38	42	0.18	-0.50	0.07	-2.30	-0.11	0.03					
81395	12:48	42	0.23	-0.30	-1.24	29.00	1.00	-1.05					
81395	12:58	42	0.10	-0.20	0.97	6.90	0.32	0.93					
81395	13:08	42	0.23	-0.20	0.55	-13.60	-0.48	0.59					
81395	13:18	42	0.24	-0.10	-0.46	9.40	0.35	-0.48					
1 hour differences													
81395	12:18	42	0.36	-1.00	-0.17	17.20	0.83	0.52					
81395	13:18	42	0.39	1.80	-1.09	40.90	2.00	-0.60					
2 hour differences													
81395	13:18	42	0.75	0.80	-1.26	58.10	2.83	-0.08					

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date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.47	-0.04	0.17	0.14
81495	11:18	5	-0.04	0.40	-0.76	-11.50	-0.31	-0.71	humidity	0.40	-2.00	-0.57	0.72
81495	11:28	5	0.10	-0.30	0.58	2.90	0.10	0.57	wind	0.94	-0.78	0.01	0.60
81495	11:38	5	0.12	-0.30	0.00	0.00	0.00	0.00	direction	46.30	-30.60	0.48	19.12
81495	11:48	5	-0.03	0.20	0.02	-2.20	-0.04	0.03	u	1.00	-0.41	0.01	0.41
81495	11:58	5	0.20	-0.30	-0.40	-30.60	-0.41	-0.47	v	0.98	-0.88	0.01	0.62
81495	12:08	5	0.17	-0.40	0.66	-1.60	-0.32	0.58					
81495	12:18	5	0.10	-0.30	-0.26	46.30	1.00	-0.17					
81495	12:28	5	0.27	-0.80	0.94	-11.40	-0.09	0.98					
81495	12:38	5	0.33	-0.20	-0.71	6.30	0.05	-0.73					
81495	12:48	5	0.21	-1.90	0.72	-13.50	-0.31	0.76					
81495	12:58	5	0.26	-0.40	-0.28	15.00	0.46	-0.35					
81495	13:08	5	0.11	-1.10	0.39	-13.50	-0.40	0.46					
81495	13:18	5	0.47	-2.00	-0.78	20.10	0.45	-0.88					
1 hour differences													
81495	12:18	5	0.66	-1.40	0.60	14.80	0.33	0.54					
81495	13:18	5	1.65	-6.40	0.28	3.00	0.16	0.24					
2 hour differences													
81495	13:18	5	2.31	-7.80	0.88	17.80	0.49	0.78					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.35	-0.09	0.12	0.13
81495	11:18	30	-0.09	0.70	-0.62	2.00	-0.06	-0.62	humidity	0.70	-2.00	-0.37	0.75
81495	11:28	30	0.05	-0.20	0.42	1.00	0.14	0.40	wind	1.00	-0.76	-0.09	0.55
81495	11:38	30	0.02	-0.10	0.05	-1.50	-0.05	0.06	direction	37.60	-20.60	1.86	14.16
81495	11:48	30	-0.03	0.20	-0.08	0.20	-0.01	-0.08	u	1.48	-0.67	0.02	0.51
81495	11:58	30	0.03	0.30	-0.76	-6.40	-0.35	-0.70	v	1.07	-0.86	-0.11	0.56
81495	12:08	30	0.11	-0.10	0.45	-20.60	-0.67	0.40					
81495	12:18	30	0.04	0.20	0.43	37.60	1.48	0.27					
81495	12:28	30	0.23	-0.70	-0.08	-6.10	-0.27	0.02					
81495	12:38	30	0.27	-0.20	-0.75	1.10	-0.20	-0.72					
81495	12:48	30	0.26	-1.30	1.00	-12.20	-0.22	1.07					
81495	12:58	30	0.21	-0.40	-0.30	10.10	0.37	-0.38					
81495	13:08	30	0.16	-1.20	-0.20	2.60	0.03	-0.23					
81495	13:18	30	0.35	-2.00	-0.72	16.40	0.12	-0.86					
1 hour differences													
81495	12:18	30	0.22	0.30	0.51	10.30	0.54	0.35					
81495	13:18	30	1.48	-5.80	-1.05	11.90	-0.17	-1.10					
2 hour differences													
81495	13:18	30	1.70	-5.50	-0.54	22.20	0.37	-0.75					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.34	-0.08	0.11	0.13
81495	11:18	42	-0.08	0.60	-0.82	0.40	-0.14	-0.81	humidity	0.60	-1.90	-0.34	0.70
81495	11:28	42	0.05	-0.20	0.54	2.90	0.26	0.49	wind	0.64	-0.92	-0.14	0.49
81495	11:38	42	-0.01	0.00	-0.20	-0.20	-0.06	-0.19	direction	27.30	-17.40	2.60	12.72
81495	11:48	42	-0.02	0.20	-0.15	1.80	0.05	-0.17	u	1.30	-0.70	0.04	0.48
81495	11:58	42	0.00	0.20	-0.52	-5.90	-0.37	-0.44	v	0.77	-1.25	-0.17	0.54
81495	12:08	42	0.03	0.30	0.16	-17.40	-0.70	0.17					
81495	12:18	42	0.03	0.10	0.50	27.30	1.30	0.35					
81495	12:28	42	0.24	-0.70	-0.26	-2.60	-0.20	-0.21					
81495	12:38	42	0.21	-0.40	-0.48	5.50	0.05	-0.53					
81495	12:48	42	0.22	-0.90	0.64	-12.60	-0.34	0.77					
81495	12:58	42	0.22	-0.50	-0.23	6.00	0.22	-0.29					
81495	13:08	42	0.16	-1.20	-0.07	2.20	0.07	-0.10					
81495	13:18	42	0.34	-1.90	-0.92	26.40	0.33	-1.25					
1 hour differences													
81495	12:18	42	0.08	0.60	0.33	8.50	0.48	0.21					
81495	13:18	42	1.39	-5.60	-1.32	24.90	0.13	-1.61					
2 hour differences													
81495	13:18	42	1.47	-5.00	-0.99	33.40	0.61	-1.40					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81595	11:19	5	-0.20	0.70	-0.18	0.60	-0.01	-0.18	temp	0.56	-0.20	0.18	0.22
81595	11:29	5	-0.08	0.20	0.18	8.20	0.27	0.12	humidity	1.30	-2.50	-0.72	1.08
81595	11:39	5	-0.18	1.30	0.40	-6.70	-0.12	0.44	wind	0.72	-0.73	0.07	0.46
81595	11:49	5	0.28	-0.90	-0.02	12.90	0.45	-0.16	direction	18.40	-13.50	4.23	10.64
81595	11:59	5	0.10	0.10	-0.02	4.60	0.14	-0.10	u	0.85	-0.87	0.16	0.47
81595	12:09	5	0.56	-2.50	0.56	15.60	0.85	0.07	v	0.71	-0.73	-0.04	0.38
81595	12:19	5	0.28	-0.80	-0.73	-13.50	-0.87	-0.25					
81595	12:29	5	0.36	-1.80	0.39	14.10	0.65	-0.01					
81595	12:39	5	0.29	-1.00	-0.46	-5.50	-0.46	-0.21					
81595	12:49	5	0.27	-1.40	-0.11	18.40	0.30	-0.50					
81595	12:59	5	0.19	-1.90	0.72	-9.40	0.37	0.71					
81595	13:09	5	0.16	-0.60	-0.48	14.40	-0.08	-0.73					
81595	13:19	5	0.25	-0.80	0.65	1.30	0.60	0.24					
1 hour differences													
81595	12:19	5	0.96	-2.60	0.37	21.10	0.72	0.12					
81595	13:19	5	1.52	-7.50	0.71	33.30	1.38	-0.50					
2 hour differences													
81595	13:19	5	2.48	-10.10	1.08	54.40	2.10	-0.38					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81595	11:19	30	-0.07	0.20	0.11	1.40	0.12	0.09	temp	0.27	-0.11	0.11	0.13
81595	11:29	30	-0.11	0.60	-0.26	1.30	0.02	-0.27	humidity	0.70	-1.80	-0.46	0.84
81595	11:39	30	-0.08	0.70	0.27	4.00	0.34	0.18	wind	0.43	-0.89	-0.11	0.44
81595	11:49	30	0.07	-0.20	0.14	1.50	0.15	0.09	direction	16.40	-11.00	3.40	7.87
81595	11:59	30	0.01	0.10	-0.89	14.80	0.45	-1.23	u	0.76	-0.75	0.10	0.43
81595	12:09	30	0.19	-0.80	0.43	10.30	0.76	-0.08	v	0.53	-1.23	-0.19	0.44
81595	12:19	30	0.24	-0.90	-0.78	-5.10	-0.75	-0.37					
81595	12:29	30	0.21	-0.90	0.05	4.30	0.20	-0.11					
81595	12:39	30	0.17	-0.10	-0.65	-4.50	-0.59	-0.34					
81595	12:49	30	0.27	-1.60	0.19	16.40	0.60	-0.40					
81595	12:59	30	0.24	-1.80	0.21	-11.00	-0.15	0.53					
81595	13:09	30	0.15	0.20	-0.45	9.50	-0.08	-0.61					
81595	13:19	30	0.19	-1.50	0.24	1.30	0.23	0.09					
1 hour differences													
81595	12:19	30	0.32	-0.50	-1.09	26.80	0.97	-1.68					
81595	13:19	30	1.23	-5.70	-0.41	16.00	0.21	-0.84					
2 hour differences													
81595	13:19	30	1.55	-6.20	-1.50	42.80	1.18	-2.52					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81595	11:19	42	-0.10	0.40	-0.04	-0.40	-0.04	-0.03	temp	0.29	-0.19	0.07	0.16
81595	11:29	42	-0.14	0.60	-0.17	1.20	0.04	-0.19	humidity	1.10	-2.00	-0.31	1.03
81595	11:39	42	-0.19	1.10	0.01	1.70	0.13	-0.04	wind	0.62	-1.09	-0.15	0.52
81595	11:49	42	0.07	-0.40	0.22	2.90	0.30	0.12	direction	13.80	-6.50	2.75	6.32
81595	11:59	42	-0.12	0.70	-1.09	9.40	0.12	-1.28	u	0.99	-0.67	0.06	0.46
81595	12:09	42	0.09	-0.30	0.42	13.80	0.99	-0.27	v	0.45	-1.28	-0.22	0.45
81595	12:19	42	0.29	-1.50	-0.41	-6.50	-0.60	0.00					
81595	12:29	42	0.11	-0.30	-0.20	2.10	-0.03	-0.24					
81595	12:39	42	0.12	0.20	-0.75	-4.60	-0.67	-0.42					
81595	12:49	42	0.26	-1.50	-0.01	11.10	0.39	-0.37					
81595	12:59	42	0.26	-2.00	0.33	-5.90	0.02	0.45					
81595	13:09	42	0.11	0.60	-0.88	6.10	-0.42	-0.82					
81595	13:19	42	0.19	-1.60	0.62	4.80	0.61	0.23					
1 hour differences													
81595	12:19	42	0.00	0.20	-1.02	22.50	0.98	-1.66					
81595	13:19	42	1.05	-4.60	-0.89	13.60	-0.10	-1.17					
2 hour differences													
81595	13:19	42	1.05	-4.40	-1.91	36.10	0.88	-2.83					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81695	11:20	5	-0.15	1.20	0.39	-13.50	-0.19	0.34	temp	0.73	-0.20	0.23	0.28
81695	11:30	5	-0.08	0.30	0.37	0.00	-0.16	0.33	humidity	1.20	-5.80	-0.64	1.71
81695	11:40	5	0.09	0.10	0.68	-16.40	-0.66	0.37	wind	1.16	-1.03	0.11	0.62
81695	11:50	5	-0.20	0.70	-0.52	14.60	0.56	-0.24	direction	72.80	-25.10	0.64	24.97
81695	12:00	5	0.22	-0.70	-0.47	72.80	0.85	-0.51	u	0.85	-0.72	-0.01	0.44
81695	12:10	5	0.14	-0.10	1.16	-19.20	0.36	1.15	v	1.15	-1.05	0.11	0.58
81695	12:20	5	0.43	-0.30	-0.10	-25.10	-0.72	0.07					
81695	12:30	5	0.62	-0.40	-1.03	-15.00	-0.16	-1.05					
81695	12:40	5	0.73	-5.80	0.83	6.10	-0.06	0.84					
81695	12:50	5	0.37	-0.60	-0.20	10.60	0.25	-0.19					
81695	13:00	5	0.38	-1.60	0.42	-10.90	-0.29	0.40					
81695	13:10	5	0.13	0.00	0.18	5.30	0.14	0.20					
81695	13:20	5	0.37	-1.10	-0.32	-1.00	-0.01	-0.32					
1 hour differences													
81695	12:20	5	0.60	0.00	1.12	26.70	0.23	1.17					
81695	13:20	5	2.60	-9.50	-0.12	-4.90	-0.13	-0.12					
2 hour differences													
81695	13:20	5	3.20	-9.50	1.00	21.80	0.10	1.05					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81695	11:20	30	-0.14	0.70	-0.09	4.20	0.14	-0.13	temp	0.43	-0.41	0.16	0.24
81695	11:30	30	-0.04	0.20	0.26	-6.50	-0.20	0.32	humidity	1.80	-2.20	-0.34	1.17
81695	11:40	30	0.14	-0.60	0.16	-12.40	-0.56	0.21	wind	0.56	-0.95	-0.07	0.49
81695	11:50	30	0.43	-1.70	0.18	9.70	0.49	0.15	direction	12.50	-25.00	-1.53	11.56
81695	12:00	30	-0.41	1.80	-0.44	10.40	0.37	-0.55	u	0.68	-0.88	-0.06	0.47
81695	12:10	30	0.26	-0.40	0.37	12.50	0.68	0.08	v	0.60	-0.93	-0.06	0.48
81695	12:20	30	0.17	-0.40	0.15	-8.70	-0.32	0.34					
81695	12:30	30	0.41	-2.20	-0.95	-5.50	-0.56	-0.81					
81695	12:40	30	0.37	-1.90	-0.03	-25.00	-0.88	0.05					
81695	12:50	30	0.18	0.90	-0.50	8.20	0.28	-0.48					
81695	13:00	30	0.33	-0.80	0.37	-13.00	-0.42	0.33					
81695	13:10	30	0.07	-0.60	0.56	9.20	0.27	0.60					
81695	13:20	30	0.35	0.60	-0.92	-3.00	-0.03	-0.93					
1 hour differences													
81695	12:20	30	0.55	-1.10	0.68	5.00	0.46	0.55					
81695	13:20	30	1.71	-4.00	-1.47	-29.10	-1.34	-1.24					
2 hour differences													
81695	13:20	30	2.26	-5.10	-0.79	-24.10	-0.88	-0.69					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81695	11:20	42	-0.12	0.50	0.02	3.30	0.18	-0.04	temp	0.84	-0.61	0.11	0.41
81695	11:30	42	-0.03	0.10	0.04	-4.40	-0.22	0.12	humidity	3.10	-5.40	-0.22	2.21
81695	11:40	42	0.24	-1.00	0.40	-6.10	-0.26	0.48	wind	0.40	-1.02	-0.11	0.42
81695	11:50	42	0.76	-2.70	0.22	4.10	0.31	0.15	direction	13.80	-15.40	-1.46	7.84
81695	12:00	42	-0.41	1.80	-0.10	6.30	0.37	-0.22	u	0.70	-0.81	-0.08	0.43
81695	12:10	42	0.84	-5.40	-0.16	13.80	0.70	-0.56	v	0.48	-1.02	-0.10	0.43
81695	12:20	42	-0.61	3.10	-0.14	-5.10	-0.34	0.05					
81695	12:30	42	-0.20	0.70	-0.56	-11.50	-0.81	-0.25					
81695	12:40	42	0.31	-1.30	-0.21	-15.40	-0.77	-0.06					
81695	12:50	42	0.09	1.80	-0.62	0.30	-0.02	-0.62					
81695	13:00	42	0.34	-1.60	0.36	-7.10	-0.28	0.35					
81695	13:10	42	0.03	0.20	0.36	1.90	0.07	0.37					
81695	13:20	42	0.20	0.90	-1.02	0.90	0.06	-1.02					
1 hour differences													
81695	12:20	42	0.79	-4.10	0.26	8.60	0.56	0.02					
81695	13:20	42	0.77	0.70	-1.69	-30.90	-1.75	-1.23					
2 hour differences													
81695	13:20	42	1.56	-3.40	-1.43	-22.30	-1.19	-1.21					

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date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.63	-0.08	0.26	0.19
81795	11:21	5	0.20	-1.10	-0.23	15.60	0.26	-0.08	humidity	0.10	-3.90	-0.99	1.12
81795	11:31	5	0.11	-0.70	0.07	7.10	0.02	0.09	wind	0.60	-0.59	0.04	0.40
81795	11:41	5	0.07	0.10	-0.06	-17.30	-0.09	-0.13	direction	52.30	-31.90	1.89	20.89
81795	11:51	5	-0.08	0.10	0.38	-8.00	-0.33	0.20	u	0.89	-0.83	0.00	0.44
81795	12:01	5	0.09	0.00	0.60	14.90	-0.18	0.64	v	0.79	-0.58	0.05	0.37
81795	12:11	5	0.40	-2.40	0.19	-16.00	-0.44	-0.15					
81795	12:21	5	0.22	-0.90	-0.35	9.60	0.42	-0.07					
81795	12:31	5	0.41	-1.60	-0.27	-4.50	0.12	-0.26					
81795	12:41	5	0.63	-3.90	0.50	52.30	0.89	0.79					
81795	12:51	5	0.48	-0.90	-0.59	-12.50	-0.27	-0.58					
81795	13:01	5	0.23	-0.80	0.60	-31.90	-0.83	0.29					
81795	13:11	5	0.34	-0.50	-0.38	9.60	0.39	-0.20					
81795	13:21	5	0.32	-0.30	0.04	5.70	0.09	0.08					
1 hour differences													
81795	12:21	5	0.81	-3.80	0.83	-9.70	-0.60	0.58					
81795	13:21	5	2.41	-8.00	-0.10	18.70	0.39	0.12					
2 hour differences													
81795	13:21	5	3.22	-11.80	0.73	9.00	-0.21	0.70					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.55	-0.16	0.17	0.23
81795	11:21	30	-0.07	0.30	-0.55	3.60	0.32	-0.46	humidity	1.10	-2.70	-0.50	1.23
81795	11:31	30	0.03	-0.10	0.20	6.40	0.11	0.25	wind	1.31	-1.09	-0.08	0.66
81795	11:41	30	0.20	-1.10	0.02	0.20	0.00	0.02	direction	12.70	-13.50	0.10	7.76
81795	11:51	30	-0.16	0.80	0.34	-4.90	-0.26	0.28	u	0.43	-0.58	0.03	0.30
81795	12:01	30	0.43	-2.60	1.31	-2.50	-0.58	1.18	v	1.18	-1.14	-0.07	0.63
81795	12:11	30	-0.11	1.10	-0.81	-4.30	0.13	-0.83					
81795	12:21	30	0.00	-0.30	-0.21	3.40	0.22	-0.13					
81795	12:31	30	0.37	-1.90	-0.39	0.10	0.16	-0.36					
81795	12:41	30	0.55	-2.70	-0.07	12.60	0.43	0.06					
81795	12:51	30	0.36	-0.60	-0.52	-10.00	-0.14	-0.58					
81795	13:01	30	0.07	0.30	0.88	-2.50	-0.40	0.79					
81795	13:11	30	0.17	0.40	-1.09	-13.50	0.18	-1.14					
81795	13:21	30	0.32	-0.10	-0.10	12.70	0.27	0.04					
1 hour differences													
81795	12:21	30	0.39	-2.20	0.85	-1.70	-0.38	0.77					
81795	13:21	30	1.84	-4.60	-1.29	-0.60	0.50	-1.19					
2 hour differences													
81795	13:21	30	2.23	-6.80	-0.44	-2.30	0.12	-0.42					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.74	-0.67	0.09	0.35
81795	11:21	42	-0.10	0.10	-1.00	-1.10	0.36	-0.93	humidity	4.90	-5.10	-0.14	2.32
81795	11:31	42	-0.31	2.10	-0.08	7.40	0.32	0.04	wind	1.26	-1.13	-0.17	0.73
81795	11:41	42	0.13	-0.90	0.55	-1.80	-0.25	0.49	direction	14.30	-15.30	0.29	7.94
81795	11:51	42	0.04	-0.40	0.28	0.80	-0.05	0.28	u	0.44	-0.25	0.08	0.25
81795	12:01	42	0.74	-5.10	1.26	2.10	-0.25	1.25	v	1.25	-1.23	-0.15	0.74
81795	12:11	42	-0.67	4.90	-1.13	-7.10	-0.07	-1.23					
81795	12:21	42	-0.03	-0.50	0.05	0.50	0.01	0.06					
81795	12:31	42	0.38	-1.50	-0.58	2.30	0.33	-0.49					
81795	12:41	42	0.49	-2.40	-0.37	7.60	0.44	-0.25					
81795	12:51	42	0.09	0.70	-0.74	-10.80	-0.13	-0.83					
81795	13:01	42	0.05	0.70	0.66	4.90	-0.08	0.68					
81795	13:11	42	0.06	0.50	-0.98	-15.30	-0.01	-1.09					
81795	13:21	42	0.31	0.00	-0.16	14.30	0.36	0.01					
1 hour differences													
81795	12:21	42	-0.10	0.10	0.93	1.90	-0.29	0.89					
81795	13:21	42	1.38	-2.00	-2.17	3.00	0.91	-1.97					
2 hour differences													
81795	13:21	42	1.28	-1.90	-1.24	4.90	0.62	-1.08					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81895	11:21	5	-0.03	-0.10	0.35	-47.50	-0.47	-0.22	temp	0.74	-0.38	0.30	0.31
81895	11:31	5	0.26	-1.10	-0.11	4.50	0.11	0.04	humidity	2.60	-3.90	-1.02	1.80
81895	11:41	5	-0.03	0.30	0.01	-84.10	0.44	-0.64	wind	0.36	-0.61	0.01	0.31
81895	11:51	5	0.55	-2.40	-0.45	115.80	0.03	0.65	direction	115.80	-84.10	-2.50	45.90
81895	12:01	5	-0.38	2.60	0.36	-9.50	-0.33	0.16	u	0.60	-0.47	-0.01	0.30
81895	12:11	5	0.26	-0.50	0.32	30.40	0.02	0.46	v	0.65	-0.64	-0.01	0.33
81895	12:21	5	0.66	-2.70	-0.36	1.00	0.19	-0.31					
81895	12:31	5	0.74	-3.90	0.03	-26.60	-0.18	-0.12					
81895	12:41	5	0.28	0.20	0.19	-28.00	-0.27	-0.20					
81895	12:51	5	0.51	-3.70	0.23	5.60	-0.21	0.11					
81895	13:01	5	0.36	-0.90	0.03	-3.60	-0.04	-0.05					
81895	13:11	5	0.37	0.00	0.08	6.30	-0.06	0.12					
81895	13:21	5	0.40	-1.00	-0.61	3.20	0.60	-0.13					
1 hour differences													
81895	12:21	5	1.32	-3.80	-0.23	58.10	0.46	0.36					
81895	13:21	5	2.66	-9.30	-0.05	-43.10	-0.16	-0.27					
2 hour differences													
81895	13:21	5	3.98	-13.10	-0.28	15.00	0.30	0.09					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81895	11:21	30	0.21	-1.90	0.14	-8.20	-0.24	-0.02	temp	0.40	-0.26	0.17	0.21
81895	11:31	30	0.02	-0.70	-0.31	-13.00	0.08	-0.41	humidity	2.40	-1.90	-0.32	1.27
81895	11:41	30	-0.26	2.40	-0.30	-78.70	0.41	-1.13	wind	0.34	-0.72	-0.06	0.29
81895	11:51	30	0.25	-1.30	0.03	50.20	-0.29	0.61	direction	50.20	-78.70	-4.31	31.73
81895	12:01	30	0.32	-1.50	0.34	19.30	-0.26	0.39	u	0.72	-0.47	0.03	0.34
81895	12:11	30	0.19	-0.80	0.25	23.00	0.07	0.56	v	0.61	-1.13	-0.08	0.50
81895	12:21	30	-0.07	0.00	-0.11	9.40	0.24	0.06					
81895	12:31	30	0.13	-0.20	0.19	-20.10	-0.47	-0.22					
81895	12:41	30	-0.06	1.90	-0.08	-18.40	-0.12	-0.45					
81895	12:51	30	0.40	-0.60	-0.30	18.30	0.43	0.24					
81895	13:01	30	0.38	-1.20	0.08	1.40	-0.05	0.07					
81895	13:11	30	0.32	0.50	-0.05	-36.00	-0.16	-0.70					
81895	13:21	30	0.38	-0.70	-0.72	-3.20	0.72	-0.01					
1 hour differences													
81895	12:21	30	0.45	-1.90	-0.10	10.20	0.25	0.08					
81895	13:21	30	1.55	-0.30	-0.88	-58.00	0.35	-1.07					
2 hour differences													
81895	13:21	30	2.00	-2.20	-0.98	-47.80	0.60	-0.99					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81895	11:21	42	0.15	-1.20	0.11	-9.00	-0.36	-0.17	temp	0.56	-0.75	0.08	0.33
81895	11:31	42	-0.06	1.20	-0.32	-4.30	0.12	-0.34	humidity	4.40	-3.00	0.21	1.78
81895	11:41	42	-0.75	4.40	-1.04	-38.60	0.53	-1.37	wind	0.48	-1.04	-0.16	0.46
81895	11:51	42	0.27	-1.20	0.36	22.30	-0.23	0.57	direction	22.30	-38.60	-5.57	18.36
81895	12:01	42	0.56	-3.00	0.48	9.20	-0.29	0.47	u	0.93	-0.36	0.08	0.39
81895	12:11	42	0.12	-0.10	0.40	12.50	-0.01	0.62	v	0.62	-1.37	-0.16	0.55
81895	12:21	42	-0.09	0.20	-0.36	10.00	0.52	-0.03					
81895	12:31	42	-0.08	0.80	-0.11	-14.30	-0.29	-0.41					
81895	12:41	42	-0.19	1.80	-0.20	-10.00	-0.02	-0.37					
81895	12:51	42	0.25	-0.40	-0.20	10.60	0.33	0.12					
81895	13:01	42	0.28	-0.40	0.09	-4.70	-0.15	-0.04					
81895	13:11	42	0.25	1.10	-0.33	-29.80	0.02	-0.80					
81895	13:21	42	0.35	-0.50	-0.92	-26.30	0.93	-0.27					
1 hour differences													
81895	12:21	42	0.05	1.50	-0.48	11.10	0.64	-0.08					
81895	13:21	42	0.86	2.40	-1.67	-74.50	0.82	-1.77					
2 hour differences													
81895	13:21	42	0.91	3.90	-2.15	-63.40	1.46	-1.85					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81995	11:22	5	-0.60	2.30	-0.11	-1.70	0.10	-0.06	temp	0.65	-0.60	0.22	0.38
81995	11:32	5	0.17	-0.30	-0.22	8.50	0.25	0.06	humidity	2.30	-3.70	-0.88	1.69
81995	11:42	5	-0.28	0.50	-0.05	35.90	0.34	0.33	wind	0.38	-0.80	-0.06	0.31
81995	11:52	5	0.31	-0.50	0.10	-9.30	-0.16	0.00	direction	164.80	-107.60	16.44	72.44
81995	12:02	5	0.65	-2.30	-0.80	164.80	0.58	-0.65	u	0.58	-0.43	0.10	0.28
81995	12:12	5	-0.23	0.80	0.36	-107.60	0.08	0.40	v	0.40	-0.65	-0.05	0.29
81995	12:22	5	0.42	-0.60	0.03	67.30	0.32	-0.33					
81995	12:32	5	0.47	-1.00	-0.43	96.60	-0.43	-0.05					
81995	12:42	5	0.49	-2.90	0.14	-59.70	0.12	-0.07					
81995	12:52	5	0.55	-3.70	0.07	31.90	-0.02	-0.12					
81995	13:02	5	0.32	-0.20	-0.10	-67.40	0.01	0.20					
81995	13:12	5	0.08	-0.60	0.38	-3.10	0.37	0.06					
81995	13:22	5	0.54	-2.90	-0.11	57.50	-0.23	-0.36					
1 hour differences													
81995	12:22	5	1.04	-2.40	-0.58	159.60	1.41	-0.19					
81995	13:22	5	2.45	-11.30	-0.05	55.80	-0.18	-0.34					
2 hour differences													
81995	13:22	5	3.49	-13.70	-0.63	215.40	1.23	-0.53					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81995	11:22	30	0.00	-0.30	-0.08	-14.20	0.06	-0.39	temp	0.50	-0.15	0.11	0.20
81995	11:32	30	-0.10	1.00	-0.39	-6.70	0.41	-0.10	humidity	2.40	-2.70	-0.37	1.33
81995	11:42	30	0.08	-0.70	-0.27	-0.20	0.27	0.05	wind	0.44	-0.54	-0.08	0.32
81995	11:52	30	0.20	-1.10	0.05	5.70	-0.07	0.08	direction	166.10	-171.10	4.29	71.71
81995	12:02	30	-0.09	0.40	-0.54	-29.30	0.61	-0.12	u	0.61	-0.31	0.15	0.31
81995	12:12	30	0.02	0.20	0.02	21.70	-0.08	0.12	v	0.37	-0.39	-0.05	0.25
81995	12:22	30	0.03	0.20	0.06	252.80	0.61	-0.30					
81995	12:32	30	0.11	-0.80	-0.02	-5.00	0.02	0.04					
81995	12:42	30	0.45	-2.30	-0.41	-171.10	-0.26	0.37					
81995	12:52	30	-0.15	2.40	0.43	166.10	0.30	-0.36					
81995	13:02	30	0.27	-0.90	-0.43	-256.10	-0.31	0.33					
81995	13:12	30	0.16	-0.20	0.44	225.80	0.45	-0.14					
81995	13:22	30	0.50	-2.70	0.15	27.10	-0.01	-0.29					
1 hour differences													
81995	12:22	30	0.14	0.00	-1.07	244.00	1.75	-0.27					
81995	13:22	30	1.34	-4.50	0.16	-13.20	0.19	-0.05					
2 hour differences													
81995	13:22	30	1.48	-4.50	-0.91	230.80	1.94	-0.32					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81995	11:22	42	-0.06	0.10	-0.12	-12.30	0.07	-0.38	temp	0.48	-0.12	0.08	0.20
81995	11:32	42	-0.12	0.70	-0.16	-5.60	0.16	-0.15	humidity	2.30	-2.30	-0.21	1.45
81995	11:42	42	0.01	0.00	-0.29	8.40	0.29	0.20	wind	0.53	-0.84	-0.06	0.41
81995	11:52	42	0.14	-0.80	0.01	13.30	0.04	0.28	direction	61.10	-30.10	4.16	24.35
81995	12:02	42	0.00	-0.30	-0.84	-2.00	0.80	-0.26	u	0.80	-0.42	0.19	0.36
81995	12:12	42	-0.08	0.80	0.16	1.00	-0.15	0.05	v	0.35	-0.38	-0.07	0.24
81995	12:22	42	0.18	-0.90	-0.38	61.10	0.63	-0.26					
81995	12:32	42	-0.08	0.20	0.30	-10.60	0.27	-0.15					
81995	12:42	42	0.37	-2.20	-0.30	37.20	-0.33	0.11					
81995	12:52	42	-0.11	2.30	0.53	-30.10	0.47	-0.31					
81995	13:02	42	0.35	-2.10	-0.54	6.20	-0.42	0.35					
81995	13:12	42	-0.02	1.80	0.50	-24.30	0.50	-0.15					
81995	13:22	42	0.48	-2.30	0.30	11.80	0.18	-0.29					
1 hour differences													
81995	12:22	42	0.13	-0.50	-1.50	46.00	1.77	-0.14					
81995	13:22	42	0.99	-2.30	0.79	-9.80	0.67	-0.44					
2 hour differences													
81995	13:22	42	1.12	-2.80	-0.71	36.20	2.44	-0.58					

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date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.68	-0.53	0.09	0.27
82095	11:23	5	0.06	0.80	0.11	6.60	-0.03	-0.14	humidity	3.40	-3.80	-0.07	1.65
82095	11:33	5	-0.02	0.60	-0.11	-8.40	0.05	0.15	wind	0.71	-0.88	0.11	0.43
82095	11:43	5	0.17	0.00	0.22	15.50	-0.12	-0.28	direction	147.60	-40.20	25.32	54.62
82095	11:53	5	-0.53	3.40	-0.88	147.60	-0.23	0.91	u	0.54	-0.34	0.06	0.32
82095	12:03	5	0.31	-1.60	0.00	0.00	0.00	0.00	v	0.91	-0.75	-0.09	0.44
82095	12:13	5	-0.21	1.10	0.51	138.30	0.48	-0.30					
82095	12:23	5	0.13	0.10	0.25	7.40	0.16	-0.21					
82095	12:33	5	0.15	-0.30	0.38	-40.20	0.54	0.54					
82095	12:43	5	0.08	-0.90	-0.26	9.90	-0.27	-0.17					
82095	12:53	5	0.08	0.40	-0.34	4.10	-0.34	0.00					
82095	13:03	5	0.14	0.20	0.49	24.70	0.30	-0.51					
82095	13:13	5	0.16	-0.90	0.71	2.10	0.54	-0.47					
82095	13:23	5	0.68	-3.80	0.37	21.50	-0.31	-0.75					
1 hour differences													
82095	12:23	5	-0.15	3.60	-0.01	-31.60	0.34	0.27					
82095	13:23	5	1.29	-5.30	1.35	22.10	0.46	-1.36					
2 hour differences													
82095	13:23	5	1.14	-1.70	1.34	-9.50	0.80	-1.09					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.51	-0.26	0.03	0.18
82095	11:23	30	-0.04	1.20	0.01	2.90	-0.08	-0.04	humidity	1.20	-2.70	0.05	1.03
82095	11:33	30	-0.11	0.60	0.13	5.10	-0.12	-0.17	wind	0.75	-0.55	0.06	0.43
82095	11:43	30	0.16	-0.80	-0.48	-11.50	-0.59	0.41	direction	13.30	-24.40	-1.95	13.51
82095	11:53	30	0.12	-0.60	0.01	-20.30	0.68	0.11	u	0.68	-0.59	0.03	0.40
82095	12:03	30	-0.26	1.20	-0.19	-24.40	0.36	0.49	v	0.49	-0.69	-0.05	0.44
82095	12:13	30	-0.11	0.90	0.71	9.00	0.30	-0.68					
82095	12:23	30	0.09	-0.10	-0.42	3.10	-0.33	0.27					
82095	12:33	30	-0.01	0.10	0.05	-24.20	0.48	0.46					
82095	12:43	30	-0.07	0.60	-0.16	8.60	-0.26	-0.10					
82095	12:53	30	0.06	0.10	-0.55	-2.80	-0.41	0.38					
82095	13:03	30	0.04	0.00	0.56	9.50	0.30	-0.51					
82095	13:13	30	0.05	0.10	0.75	6.30	0.35	-0.69					
82095	13:23	30	0.51	-2.70	0.30	13.30	-0.30	-0.55					
1 hour differences													
82095	12:23	30	-0.11	1.20	-0.24	-16.00	0.30	0.43					
82095	13:23	30	0.58	-1.80	0.95	10.70	0.16	-1.01					
2 hour differences													
82095	13:23	30	0.47	-0.60	0.71	-5.30	0.46	-0.58					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.36	-0.17	0.03	0.15
82095	11:23	42	-0.03	0.80	-0.22	6.00	-0.31	0.10	humidity	1.20	-1.70	0.03	1.02
82095	11:33	42	-0.07	0.40	0.23	3.60	-0.06	-0.26	wind	1.27	-0.51	0.04	0.52
82095	11:43	42	0.25	-1.70	-0.15	-2.00	-1.36	0.12	direction	13.70	-23.80	-0.04	10.73
82095	11:53	42	0.13	-1.00	-0.46	-5.00	1.26	0.49	u	1.26	-1.36	0.00	0.64
82095	12:03	42	-0.13	1.10	-0.22	-23.80	0.47	0.56	v	0.56	-1.09	-0.04	0.53
82095	12:13	42	-0.17	0.90	0.68	13.50	0.06	-0.81					
82095	12:23	42	-0.03	0.80	-0.48	-1.20	-0.22	0.43					
82095	12:33	42	0.08	-1.00	-0.22	-16.80	0.23	0.48					
82095	12:43	42	-0.10	1.20	0.15	7.00	-0.03	-0.25					
82095	12:53	42	-0.02	0.50	-0.51	-2.50	-0.31	0.42					
82095	13:03	42	-0.01	0.40	0.49	2.30	0.30	-0.40					
82095	13:13	42	0.12	-1.30	1.27	4.70	0.67	-1.09					
82095	13:23	42	0.36	-0.70	-0.10	13.70	-0.65	-0.27					
1 hour differences													
82095	12:23	42	-0.02	0.50	-0.40	-10.90	0.15	0.53					
82095	13:23	42	0.43	-0.90	1.08	8.40	0.21	-1.11					
2 hour differences													
82095	13:23	42	0.41	-0.40	0.68	-2.50	0.36	-0.58					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82195	11:24	5	-0.01	0.10	0.77	13.40	-0.74	-0.52	temp	0.26	-0.02	0.09	0.11
82195	11:34	5	0.02	0.00	0.21	-1.50	-0.04	-0.21	humidity	0.30	-1.40	-0.30	0.51
82195	11:44	5	-0.02	0.20	-0.22	-1.20	0.15	0.17	wind	0.77	-0.49	0.12	0.41
82195	11:54	5	-0.02	0.20	0.21	-3.20	0.04	-0.25	direction	14.70	-10.00	1.30	7.72
82195	12:04	5	0.03	0.00	-0.14	0.60	0.03	0.14	u	0.25	-0.74	-0.10	0.26
82195	12:14	5	0.11	-0.40	0.09	7.50	-0.34	0.07	v	0.70	-0.82	-0.08	0.46
82195	12:24	5	0.00	0.30	-0.49	7.20	0.04	0.57					
82195	12:34	5	0.03	-0.30	0.71	-9.90	-0.04	-0.82					
82195	12:44	5	0.14	-0.30	-0.20	-3.70	0.25	0.10					
82195	12:54	5	0.25	-0.90	-0.45	14.70	-0.28	0.70					
82195	13:04	5	0.23	-0.80	0.32	0.20	-0.21	-0.24					
82195	13:14	5	0.26	-1.40	0.61	-10.00	0.05	-0.78					
82195	13:24	5	0.21	-0.60	0.09	2.80	-0.18	0.01					
1 hour differences													
82195	12:24	5	0.12	0.30	-0.34	9.40	-0.12	0.49					
82195	13:24	5	1.12	-4.30	1.08	-5.90	-0.41	-1.03					
2 hour differences													
82195	13:24	5	1.24	-4.00	0.74	3.50	-0.53	-0.54					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82195	11:24	30	-0.03	0.20	0.53	8.00	-0.66	-0.27	temp	0.27	-0.05	0.07	0.11
82195	11:34	30	-0.05	0.20	-0.01	-1.50	0.09	-0.04	humidity	0.30	-1.20	-0.22	0.44
82195	11:44	30	-0.02	0.10	-0.17	-2.40	0.21	0.09	wind	1.06	-1.09	0.04	0.51
82195	11:54	30	-0.04	0.30	0.41	0.60	-0.21	-0.36	direction	10.10	-9.90	0.76	5.05
82195	12:04	30	0.06	0.00	-0.22	3.90	-0.13	0.32	u	0.21	-0.66	-0.06	0.23
82195	12:14	30	0.03	-0.20	0.11	-3.40	0.15	-0.20	v	1.23	-1.20	-0.02	0.55
82195	12:24	30	0.05	0.10	-0.32	3.00	-0.03	0.37					
82195	12:34	30	0.03	-0.20	0.05	-1.10	0.04	-0.08					
82195	12:44	30	0.09	-0.30	0.37	0.10	-0.18	-0.32					
82195	12:54	30	0.16	-0.60	-0.04	2.00	-0.10	0.10					
82195	13:04	30	0.27	-0.70	-1.09	10.10	0.14	1.23					
82195	13:14	30	0.25	-1.20	1.06	-9.90	-0.14	-1.20					
82195	13:24	30	0.17	-0.60	-0.11	0.50	0.03	0.12					
1 hour differences													
82195	12:24	30	0.03	0.50	-0.20	0.20	0.08	0.18					
82195	13:24	30	0.97	-3.60	0.24	1.70	-0.21	-0.15					
2 hour differences													
82195	13:24	30	1.00	-3.10	0.04	1.90	-0.13	0.03					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82195	11:24	42	-0.02	0.20	0.47	6.00	-0.57	-0.23	temp	0.32	-0.06	0.07	0.11
82195	11:34	42	-0.06	0.20	-0.14	-1.20	0.14	0.08	humidity	0.20	-1.10	-0.22	0.42
82195	11:44	42	-0.02	0.20	-0.14	-4.10	0.31	0.00	wind	0.59	-0.79	0.04	0.37
82195	11:54	42	-0.05	0.20	0.41	3.80	-0.42	-0.24	direction	16.10	-10.60	0.58	6.24
82195	12:04	42	0.07	0.00	-0.13	1.70	-0.04	0.17	u	0.31	-0.57	-0.05	0.28
82195	12:14	42	0.02	-0.10	-0.01	-3.50	0.22	-0.11	v	1.28	-0.90	-0.02	0.49
82195	12:24	42	0.04	-0.10	-0.19	3.00	-0.09	0.27					
82195	12:34	42	0.04	-0.10	-0.10	0.40	0.03	0.10					
82195	12:44	42	0.06	-0.30	0.47	-0.10	-0.23	-0.41					
82195	12:54	42	0.14	-0.50	0.14	-1.90	0.05	-0.19					
82195	13:04	42	0.32	-1.10	-0.79	16.10	-0.41	1.28					
82195	13:14	42	0.17	-0.80	0.59	-10.60	0.17	-0.90					
82195	13:24	42	0.19	-0.60	-0.04	-2.00	0.14	-0.05					
1 hour differences													
82195	12:24	42	0.00	0.40	-0.20	-0.30	0.12	0.17					
82195	13:24	42	0.92	-3.40	0.27	1.90	-0.25	-0.17					
2 hour differences													
82195	13:24	42	0.92	-3.00	0.07	1.60	-0.13	0.00					

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date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.33	-0.11	0.11	0.12
82295	11:24	5	-0.11	0.40	0.06	7.80	-0.26	0.19	humidity	0.40	-1.60	-0.52	0.57
82295	11:34	5	-0.01	0.00	0.18	-8.70	0.13	-0.39	wind	1.00	-0.76	0.05	0.45
82295	11:44	5	0.05	-0.20	0.38	12.00	-0.67	0.16	direction	12.00	-8.70	1.61	6.24
82295	11:54	5	0.11	-0.60	0.20	1.30	-0.20	-0.06	u	0.79	-1.06	-0.08	0.49
82295	12:04	5	0.00	0.20	-0.44	-1.20	0.39	0.21	v	0.53	-0.39	0.03	0.26
82295	12:14	5	0.17	-1.10	1.00	7.50	-1.06	-0.19					
82295	12:24	5	0.13	-0.60	0.02	4.60	-0.15	0.26					
82295	12:34	5	0.06	0.00	-0.76	-4.50	0.79	0.10					
82295	12:44	5	0.16	-1.00	0.48	3.40	-0.51	-0.05					
82295	12:54	5	0.25	-0.70	-0.16	-6.10	0.31	-0.23					
82295	13:04	5	0.15	-0.70	0.03	3.40	-0.12	0.15					
82295	13:14	5	0.16	-0.80	0.09	-4.70	0.06	-0.28					
82295	13:24	5	0.33	-1.60	-0.49	6.10	0.26	0.53					
1 hour differences													
82295	12:24	5	0.45	-2.30	1.34	15.50	-1.56	-0.01					
82295	13:24	5	1.11	-4.80	-0.81	-2.40	0.79	0.22					
2 hour differences													
82295	13:24	5	1.56	-7.10	0.53	13.10	-0.77	0.21					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.33	-0.06	0.09	0.10
82295	11:24	30	-0.06	0.20	0.02	5.30	-0.20	0.23	humidity	0.20	-1.30	-0.43	0.47
82295	11:34	30	-0.02	0.10	-0.01	-5.70	0.21	-0.25	wind	0.91	-1.08	0.05	0.61
82295	11:44	30	0.02	-0.20	0.91	1.20	-0.75	-0.53	direction	10.00	-8.30	1.49	5.13
82295	11:54	30	0.08	-0.40	-0.61	7.40	0.20	0.76	u	0.86	-0.75	-0.09	0.46
82295	12:04	30	0.00	0.00	0.53	-1.50	-0.39	-0.37	v	0.95	-0.84	0.06	0.53
82295	12:14	30	0.11	-0.80	0.37	-1.20	-0.25	-0.28					
82295	12:24	30	0.14	-0.60	0.33	5.30	-0.51	0.18					
82295	12:34	30	-0.01	0.20	-1.08	2.70	0.86	0.69					
82295	12:44	30	0.14	-0.80	-0.06	-1.60	0.10	-0.06					
82295	12:54	30	0.18	-0.70	0.66	2.80	-0.68	-0.13					
82295	13:04	30	0.13	-0.40	-0.45	3.00	0.32	0.38					
82295	13:14	30	0.10	-0.90	0.66	-8.30	-0.31	-0.84					
82295	13:24	30	0.33	-1.30	-0.67	10.00	0.28	0.95					
1 hour differences													
82295	12:24	30	0.33	-1.90	1.52	5.50	-1.49	-0.49					
82295	13:24	30	0.87	-3.90	-0.94	8.60	0.57	0.99					
2 hour differences													
82295	13:24	30	1.20	-5.80	0.58	14.10	-0.92	0.50					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.29	-0.07	0.08	0.10
82295	11:24	42	-0.07	0.20	-0.15	5.10	-0.07	0.34	humidity	0.20	-1.00	-0.41	0.43
82295	11:34	42	-0.04	0.10	0.05	-3.00	0.07	-0.17	wind	0.95	-0.91	0.03	0.58
82295	11:44	42	0.03	-0.20	0.95	-3.30	-0.59	-0.78	direction	11.10	-12.30	1.17	7.04
82295	11:54	42	0.08	-0.40	-0.30	9.10	-0.16	0.72	u	0.60	-0.62	-0.07	0.43
82295	12:04	42	-0.02	0.00	0.30	-0.80	-0.22	-0.21	v	0.82	-1.14	0.05	0.66
82295	12:14	42	0.11	-0.70	0.29	-6.40	0.06	-0.58					
82295	12:24	42	0.11	-0.60	0.13	10.20	-0.58	0.63					
82295	12:34	42	0.00	0.20	-0.74	4.20	0.51	0.62					
82295	12:44	42	0.13	-0.70	-0.61	-1.70	0.60	0.16					
82295	12:54	42	0.17	-0.80	0.81	-2.90	-0.62	-0.55					
82295	13:04	42	0.12	-0.40	-0.02	11.10	-0.32	0.76					
82295	13:14	42	0.12	-1.00	0.62	-12.30	-0.16	-1.14					
82295	13:24	42	0.29	-1.00	-0.91	5.90	0.60	0.82					
1 hour differences													
82295	12:24	42	0.27	-1.80	1.42	5.80	-1.42	-0.39					
82295	13:24	42	0.83	-3.70	-0.85	4.30	0.61	0.67					
2 hour differences													
82295	13:24	42	1.10	-5.50	0.57	10.10	-0.81	0.28					

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incomplete data

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date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.32	-0.12	0.15	0.13
82495	11:26	5	0.08	-0.30	-0.49	4.20	0.23	0.46	humidity	0.60	-0.70	-0.23	0.40
82495	11:36	5	-0.12	0.60	0.12	20.10	-0.46	0.47	wind	0.51	-1.25	0.03	0.54
82495	11:46	5	-0.04	0.50	-0.79	-6.90	0.78	0.20	direction	20.10	-17.10	2.52	11.68
82495	11:56	5	0.17	-0.50	0.50	5.20	-0.50	-0.13	u	0.88	-0.71	-0.08	0.51
82495	12:06	5	0.22	-0.70	0.20	-11.70	0.02	-0.40	v	0.91	-0.63	0.07	0.46
82495	12:16	5	0.13	-0.40	0.51	-1.80	-0.36	-0.37					
82495	12:26	5	0.24	0.00	-1.25	7.60	0.88	0.91					
82495	12:36	5	0.21	-0.40	0.38	6.60	-0.40	-0.05					
82495	12:46	5	0.27	-0.40	0.30	-0.80	-0.26	-0.15					
82495	12:56	5	0.32	-0.70	0.14	-7.90	0.00	-0.29					
82495	13:06	5	0.13	-0.30	0.38	15.80	-0.59	0.35					
82495	13:16	5	0.08	0.00	0.04	-17.10	0.27	-0.63					
82495	13:26	5	0.29	-0.40	0.39	19.40	-0.71	0.60					
1 hour differences													
82495	12:26	5	0.60	-0.50	-0.71	12.50	0.36	0.68					
82495	13:26	5	1.30	-2.20	1.63	16.00	-1.69	-0.17					
2 hour differences													
82495	13:26	5	1.90	-2.70	0.92	28.50	-1.33	0.51					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.27	-0.07	0.14	0.12
82495	11:26	30	0.03	0.20	-0.89	0.90	0.64	0.62	humidity	0.70	-0.80	-0.15	0.38
82495	11:36	30	-0.02	0.00	-0.04	13.40	-0.28	0.47	wind	1.07	-1.12	0.00	0.66
82495	11:46	30	-0.07	0.70	-0.61	-4.00	0.60	0.18	direction	21.60	-17.10	2.65	11.08
82495	11:56	30	0.15	-0.40	0.28	9.20	-0.38	0.14	u	0.91	-1.29	-0.06	0.69
82495	12:06	30	0.27	-0.80	0.22	-6.20	-0.10	-0.30	v	0.83	-0.58	0.14	0.45
82495	12:16	30	0.02	-0.10	0.60	-7.10	-0.34	-0.58					
82495	12:26	30	0.26	-0.20	-1.12	-0.30	0.91	0.64					
82495	12:36	30	0.20	-0.20	0.37	9.20	-0.47	0.07					
82495	12:46	30	0.22	-0.40	0.32	1.40	-0.31	-0.09					
82495	12:56	30	0.20	-0.30	-0.25	-4.70	0.31	-0.05					
82495	13:06	30	0.25	-0.50	1.07	18.10	-1.29	0.41					
82495	13:16	30	0.04	0.30	-0.65	-17.10	0.90	-0.58					
82495	13:26	30	0.25	-0.20	0.64	21.60	-0.93	0.83					
1 hour differences													
82495	12:26	30	0.61	-0.80	-0.67	5.00	0.41	0.55					
82495	13:26	30	1.16	-1.30	1.50	28.50	-1.79	0.59					
2 hour differences													
82495	13:26	30	1.77	-2.10	0.83	33.50	-1.38	1.14					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.30	-0.06	0.13	0.12
82495	11:26	42	0.01	0.30	-1.00	2.90	0.69	0.74	humidity	0.60	-1.00	-0.10	0.42
82495	11:36	42	-0.02	0.00	0.29	7.10	-0.41	0.10	wind	0.95	-1.00	0.00	0.63
82495	11:46	42	-0.06	0.60	-0.40	2.20	0.30	0.27	direction	24.00	-17.20	2.70	10.30
82495	11:56	42	0.12	-0.30	-0.04	8.20	-0.09	0.31	u	1.04	-1.13	-0.06	0.64
82495	12:06	42	0.30	-1.00	0.39	-5.00	-0.28	-0.34	v	0.94	-0.61	0.14	0.49
82495	12:16	42	-0.02	0.20	0.33	-10.60	-0.03	-0.61					
82495	12:26	42	0.28	-0.20	-0.88	10.00	0.54	0.82					
82495	12:36	42	0.19	-0.40	0.45	2.50	-0.45	-0.09					
82495	12:46	42	0.17	-0.10	0.15	3.00	-0.19	0.07					
82495	12:56	42	0.20	-0.10	-0.26	-2.30	0.28	0.00					
82495	13:06	42	0.22	-0.60	0.95	10.30	-1.06	0.21					
82495	13:16	42	0.04	0.20	-0.79	-17.20	1.04	-0.55					
82495	13:26	42	0.20	0.10	0.82	24.00	-1.13	0.94					
1 hour differences													
82495	12:26	42	0.60	-0.70	-0.31	11.90	0.03	0.55					
82495	13:26	42	1.02	-0.90	1.32	20.30	-1.51	0.58					
2 hour differences													
82495	13:26	42	1.62	-1.60	1.01	32.20	-1.48	1.13					

SUNRISE 82595

incomplete data

SUNRISE 82695

date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82695	11:27	5	0.07	-0.70	0.38	19.50	-0.33	-0.30	temp	0.23	-0.11	0.11	0.11
82695	11:37	5	-0.09	0.10	0.16	-14.70	0.19	-0.22	humidity	0.20	-1.40	-0.50	0.41
82695	11:47	5	-0.11	0.20	0.34	8.40	-0.26	-0.29	wind	1.45	-0.95	0.17	0.70
82695	11:57	5	0.13	-0.40	-0.25	1.70	0.05	0.25	direction	19.50	-14.70	5.17	10.33
82695	12:07	5	0.16	-0.40	-0.01	6.30	-0.11	0.06	u	0.47	-0.94	-0.15	0.35
82695	12:17	5	0.20	-0.40	0.39	-10.80	0.09	-0.45	v	0.97	-1.12	-0.11	0.68
82695	12:27	5	0.15	-0.30	-0.01	14.10	0.47	-0.05					
82695	12:37	5	0.01	-0.50	1.02	4.90	-0.35	-1.00					
82695	12:47	5	0.23	-0.80	-0.95	6.40	-0.06	0.97					
82695	12:57	5	0.23	-1.40	0.97	5.30	-0.45	-0.88					
82695	13:07	5	0.13	-0.40	-0.56	14.60	-0.28	0.75					
82695	13:17	5	0.20	-0.80	-0.66	16.50	0.08	0.81					
82695	13:27	5	0.08	-0.70	1.45	-5.00	-0.94	-1.12					
1 hour differences													
82695	12:27	5	0.44	-1.20	0.62	23.20	0.43	-0.70					
82695	13:27	5	0.88	-4.60	1.27	42.70	-2.00	-0.47					
2 hour differences													
82695	13:27	5	1.32	-5.80	1.89	19.50	-1.57	-1.17					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82695	11:27	30	-0.05	0.10	-0.39	18.50	-0.05	0.63	temp	0.26	-0.12	0.07	0.12
82695	11:37	30	0.02	-0.30	0.44	-19.40	0.04	-0.69	humidity	0.40	-1.00	-0.28	0.41
82695	11:47	30	0.06	-0.30	-0.02	-3.80	0.11	-0.05	wind	0.85	-0.70	0.07	0.52
82695	11:57	30	-0.01	-0.10	0.39	-8.40	0.06	-0.48	direction	18.50	-19.40	1.25	10.68
82695	12:07	30	-0.05	0.30	-0.26	0.10	0.11	0.24	u	1.46	-0.89	-0.05	0.55
82695	12:17	30	0.07	-0.10	0.41	-2.40	-0.09	-0.41	v	0.74	-0.89	-0.05	0.56
82695	12:27	30	0.24	-0.60	-0.41	6.40	1.46	0.30					
82695	12:37	30	-0.12	0.40	0.83	-9.60	-0.89	-0.89					
82695	12:47	30	0.17	-0.40	-0.70	7.10	-0.16	0.74					
82695	12:57	30	0.26	-1.00	0.47	-1.80	-0.04	-0.47					
82695	13:07	30	0.09	-0.40	-0.44	8.60	-0.20	0.52					
82695	13:17	30	0.06	-0.50	-0.26	17.50	-0.39	0.51					
82695	13:27	30	0.19	-0.80	0.85	3.50	-0.65	-0.56					
1 hour differences													
82695	12:27	30	0.33	-1.10	0.55	40.30	1.69	-1.09					
82695	13:27	30	0.65	-2.70	0.75	25.30	-2.33	-0.15					
2 hour differences													
82695	13:27	30	0.98	-3.80	1.30	-15.00	-0.64	-1.24					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82695	11:27	42	-0.06	0.30	-0.41	6.20	0.13	0.44	temp	0.24	-0.14	0.06	0.11
82695	11:37	42	0.05	-0.60	0.11	-1.00	-0.06	-0.10	humidity	0.60	-1.20	-0.28	0.50
82695	11:47	42	0.03	-0.10	0.34	-14.40	0.19	-0.59	wind	1.24	-0.99	0.04	0.57
82695	11:57	42	-0.02	0.00	0.01	-1.50	0.05	-0.04	direction	15.90	-14.40	2.24	8.76
82695	12:07	42	-0.06	0.20	-0.10	-4.60	0.20	0.00	u	1.42	-0.55	-0.02	0.52
82695	12:17	42	0.08	0.00	0.45	-0.40	-0.18	-0.41	v	0.75	-1.25	-0.04	0.56
82695	12:27	42	0.21	-0.80	-0.99	15.90	1.42	0.75					
82695	12:37	42	-0.14	0.60	1.24	-4.50	-0.55	-1.25					
82695	12:47	42	0.10	-0.40	-0.33	11.50	-0.47	0.43					
82695	12:57	42	0.24	-1.20	0.03	-3.20	0.13	-0.07					
82695	13:07	42	0.08	-0.30	-0.11	12.90	-0.49	0.30					
82695	13:17	42	0.19	-0.70	-0.45	11.50	-0.14	0.62					
82695	13:27	42	0.11	-0.60	0.76	0.70	-0.50	-0.58					
1 hour differences													
82695	12:27	42	0.29	-1.30	-0.18	37.80	1.62	-0.39					
82695	13:27	42	0.58	-2.60	1.14	28.90	-2.02	-0.55					
2 hour differences													
82695	13:27	42	0.87	-3.90	0.96	-8.90	-0.40	-0.94					

SUNRISE 82795

no data available

SUNRISE 82895

date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.40	-0.59	0.15	0.24
82895	11:29	5	-0.59	3.50	-0.62	29.30	0.18	0.77	humidity	3.50	-1.80	-0.34	1.32
82895	11:39	5	0.40	-1.80	0.25	-28.40	0.04	-0.48	wind	1.22	-0.77	0.10	0.68
82895	11:49	5	0.36	-1.80	1.01	-9.40	-0.39	-0.96	direction	29.30	-28.40	-2.15	13.43
82895	11:59	5	0.07	0.00	0.16	1.80	-0.14	-0.10	u	0.58	-0.90	0.02	0.42
82895	12:09	5	0.08	0.30	-0.77	-5.50	0.53	0.58	v	0.78	-0.96	-0.12	0.64
82895	12:19	5	0.24	-1.00	0.78	-4.90	-0.19	-0.77					
82895	12:29	5	0.23	-0.80	0.73	1.80	-0.36	-0.64					
82895	12:39	5	0.23	-0.60	-0.61	2.80	0.15	0.61					
82895	12:49	5	0.22	-0.80	1.22	6.50	-0.90	-0.89					
82895	12:59	5	0.13	-0.50	-0.13	-6.80	0.42	-0.09					
82895	13:09	5	0.20	0.20	-0.68	7.50	0.00	0.78					
82895	13:19	5	0.14	-0.60	0.29	-12.20	0.40	-0.53					
82895	13:29	5	0.29	-0.50	-0.32	-10.50	0.58	0.15					
1 hour differences													
82895	12:29	5	1.38	-5.10	2.16	-44.60	-0.51	-2.37					
82895	13:29	5	1.21	-2.80	-0.23	-12.70	0.65	0.03					
2 hour differences													
82895	13:29	5	2.59	-7.90	1.93	-57.30	0.14	-2.34					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.31	-0.05	0.10	0.10
82895	11:29	30	-0.05	0.20	-0.27	7.90	-0.22	0.40	humidity	0.50	-0.90	-0.10	0.37
82895	11:39	30	0.07	0.00	-0.04	2.20	-0.06	0.09	wind	1.46	-1.12	0.01	0.71
82895	11:49	30	0.02	-0.10	1.46	-4.40	-0.52	-1.39	direction	7.90	-12.90	-0.22	5.52
82895	11:59	30	-0.02	0.50	-0.62	1.00	0.24	0.58	u	0.68	-0.61	0.01	0.34
82895	12:09	30	0.02	0.20	-0.10	-2.90	0.20	0.01	v	1.19	-1.39	-0.01	0.70
82895	12:19	30	0.08	0.10	-0.14	-4.40	0.28	0.03					
82895	12:29	30	0.17	-0.90	1.26	2.00	-0.61	-1.12					
82895	12:39	30	0.17	-0.10	-0.55	2.50	0.07	0.58					
82895	12:49	30	0.09	-0.40	0.27	1.40	-0.21	-0.20					
82895	12:59	30	0.16	-0.30	0.35	-4.80	0.18	-0.47					
82895	13:09	30	0.22	0.20	-1.12	6.10	0.11	1.19					
82895	13:19	30	0.12	-0.20	-0.22	3.40	-0.05	0.29					
82895	13:29	30	0.31	-0.50	-0.15	-12.90	0.68	-0.17					
1 hour differences													
82895	12:29	30	0.34	-0.20	1.82	-6.50	-0.47	-1.80					
82895	13:29	30	1.07	-1.30	-1.42	-4.30	0.78	1.22					
2 hour differences													
82895	13:29	30	1.41	-1.50	0.40	-10.80	0.31	-0.58					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.24	-0.07	0.08	0.10
82895	11:29	42	-0.07	0.30	-0.17	5.70	-0.19	0.30	humidity	0.50	-0.70	-0.04	0.35
82895	11:39	42	0.06	-0.10	0.16	-0.80	-0.05	-0.16	wind	1.10	-0.98	-0.01	0.54
82895	11:49	42	-0.05	0.30	1.10	-3.40	-0.36	-1.06	direction	6.50	-14.60	-0.42	5.83
82895	11:59	42	-0.03	0.30	-0.29	1.50	0.05	0.31	u	0.77	-0.54	0.02	0.35
82895	12:09	42	-0.01	0.20	-0.29	0.40	0.12	0.26	v	1.04	-1.06	-0.01	0.55
82895	12:19	42	0.00	0.50	0.00	-7.70	0.45	-0.23					
82895	12:29	42	0.11	-0.70	0.93	2.40	-0.54	-0.77					
82895	12:39	42	0.16	-0.30	-0.09	2.30	-0.12	0.16					
82895	12:49	42	0.09	-0.20	-0.21	-3.30	0.32	0.08					
82895	12:59	42	0.13	-0.20	0.24	0.40	-0.13	-0.21					
82895	13:09	42	0.19	0.10	-0.98	5.10	0.12	1.04					
82895	13:19	42	0.21	-0.30	-0.37	6.50	-0.13	0.52					
82895	13:29	42	0.24	-0.40	-0.10	-14.60	0.77	-0.31					
1 hour differences													
82895	12:29	42	0.08	0.50	1.61	-7.60	-0.33	-1.65					
82895	13:29	42	1.02	-1.30	-1.51	-3.60	0.83	1.28					
2 hour differences													
82895	13:29	42	1.10	-0.80	0.10	-11.20	0.50	-0.37					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82995	11:30	5	-0.14	0.70	-0.31	-7.50	0.34	-0.18	temp	0.52	-0.14	0.19	0.20
82995	11:40	5	-0.02	0.20	-0.11	-6.90	0.16	-0.15	humidity	0.70	-2.00	-0.64	0.86
82995	11:50	5	0.09	-0.40	0.24	11.90	-0.31	0.27	wind	0.94	-0.79	0.09	0.59
82995	12:00	5	0.06	-0.20	0.65	-4.60	-0.61	-0.28	direction	11.90	-7.50	1.33	6.87
82995	12:10	5	0.03	0.30	-0.67	6.20	0.62	0.33	u	0.84	-0.92	-0.08	0.59
82995	12:20	5	0.03	0.10	-0.79	4.80	0.78	0.17	v	0.39	-0.28	0.06	0.24
82995	12:30	5	0.17	-0.40	0.94	-5.90	-0.92	-0.22					
82995	12:40	5	0.27	-1.10	0.23	7.20	-0.25	0.23					
82995	12:50	5	0.29	-1.30	0.03	-2.70	-0.03	-0.10					
82995	13:00	5	0.43	-2.00	0.88	7.20	-0.87	0.33					
82995	13:10	5	0.31	-1.40	0.43	1.30	-0.43	0.11					
82995	13:20	5	0.41	-1.00	-0.75	10.00	0.84	0.39					
82995	13:30	5	0.52	-1.80	0.37	-3.70	-0.41	-0.09					
1 hour differences													
82995	12:30	5	0.36	-0.40	0.26	5.50	-0.28	0.12					
82995	13:30	5	2.23	-8.60	1.19	19.30	-1.15	0.87					
2 hour differences													
82995	13:30	5	2.59	-9.00	1.45	24.80	-1.43	0.99					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82995	11:30	30	-0.11	0.60	-0.20	9.20	0.11	0.64	temp	0.45	-0.11	0.13	0.19
82995	11:40	30	-0.10	0.40	-0.43	-11.80	0.54	-0.64	humidity	0.70	-2.40	-0.42	0.91
82995	11:50	30	-0.03	0.30	0.04	7.40	-0.13	0.41	wind	1.26	-1.36	-0.04	0.77
82995	12:00	30	0.08	-0.30	0.81	-0.60	-0.79	-0.16	direction	9.20	-11.80	1.99	5.74
82995	12:10	30	-0.09	0.70	-1.36	4.40	1.32	0.42	u	1.32	-1.24	0.04	0.77
82995	12:20	30	0.04	0.10	-0.75	1.40	0.74	0.11	v	0.64	-0.64	0.13	0.36
82995	12:30	30	0.09	-0.30	1.26	-3.70	-1.24	-0.28					
82995	12:40	30	0.18	-0.50	0.15	6.00	-0.17	0.34					
82995	12:50	30	0.19	-0.80	0.04	3.90	-0.03	0.24					
82995	13:00	30	0.45	-2.40	0.63	-2.70	-0.64	-0.16					
82995	13:10	30	0.27	-1.20	0.14	2.30	-0.14	0.17					
82995	13:20	30	0.37	-0.50	-1.30	2.00	1.31	0.04					
82995	13:30	30	0.39	-1.60	0.42	8.10	-0.35	0.51					
1 hour differences													
82995	12:30	30	-0.01	0.90	-0.43	-2.90	0.44	-0.14					
82995	13:30	30	1.85	-7.00	0.08	19.60	-0.02	1.14					
2 hour differences													
82995	13:30	30	1.84	-6.10	-0.35	16.70	0.42	1.00					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82995	11:30	42	-0.14	0.70	-0.01	7.80	-0.08	0.58	temp	0.45	-0.14	0.12	0.19
82995	11:40	42	-0.10	0.50	-0.50	-6.00	0.55	-0.35	humidity	0.70	-2.40	-0.41	0.95
82995	11:50	42	-0.04	0.20	0.16	2.70	-0.19	0.15	wind	1.32	-1.35	-0.01	0.92
82995	12:00	42	0.09	-0.50	0.92	-0.60	-0.90	-0.18	direction	7.80	-6.00	1.78	4.25
82995	12:10	42	-0.11	0.70	-1.35	6.60	1.29	0.61	u	1.29	-1.32	0.01	0.91
82995	12:20	42	0.00	0.30	-1.12	-0.90	1.12	0.01	v	0.61	-0.35	0.13	0.32
82995	12:30	42	0.08	-0.30	1.31	-1.90	-1.29	-0.20					
82995	12:40	42	0.16	-0.60	0.31	6.20	-0.33	0.41					
82995	12:50	42	0.17	-0.50	-0.29	3.90	0.30	0.25					
82995	13:00	42	0.45	-2.40	1.32	-1.10	-1.32	0.02					
82995	13:10	42	0.27	-1.20	-0.61	-2.60	0.60	-0.25					
82995	13:20	42	0.30	-0.40	-1.10	5.80	1.13	0.32					
82995	13:30	42	0.37	-1.80	0.82	3.20	-0.78	0.33					
1 hour differences													
82995	12:30	42	-0.08	0.90	-0.58	-0.10	0.58	0.04					
82995	13:30	42	1.72	-6.90	0.45	15.40	-0.40	1.08					
2 hour differences													
82995	13:30	42	1.64	-6.00	-0.13	15.30	0.18	1.12					

SUNSET 80695

date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
80695	23:58	5	-0.13	0.30	0.23	-0.10	-0.01	0.23	temp	-0.03	-0.50	-0.22	0.15
80795	0:08	5	-0.39	0.30	0.36	-8.00	-0.47	0.32	humidity	3.40	-0.70	0.54	1.05
80795	0:18	5	-0.50	3.40	-0.63	-16.10	-0.64	-0.85	wind	0.87	-0.92	0.01	0.50
80795	0:28	5	-0.34	-0.50	-0.20	-2.30	-0.01	-0.22	direction	19.90	-16.10	-1.37	9.97
80795	0:38	5	-0.17	-0.30	0.03	-4.50	-0.19	-0.08	u	1.02	-0.64	-0.07	0.42
80795	0:48	5	-0.36	1.20	-0.92	19.90	1.02	-0.57	v	0.78	-0.85	0.00	0.48
80795	0:58	5	-0.03	-0.70	0.07	8.90	0.25	0.11					
80795	1:08	5	-0.19	0.90	-0.35	1.30	0.05	-0.35					
80795	1:18	5	-0.07	0.00	0.02	6.60	0.16	0.01					
80795	1:28	5	-0.08	0.40	0.48	-11.30	-0.33	0.48					
80795	1:38	5	-0.22	1.00	-0.39	-12.80	-0.28	-0.46					
80795	1:48	5	-0.27	1.00	0.52	5.60	0.02	0.54					
80795	1:58	5	-0.06	0.00	0.87	-5.00	-0.45	0.78					
1 hour differences													
80795	0:58	5	-1.79	3.40	-1.29	-2.10	-0.04	-1.29					
80795	1:58	5	-0.89	3.30	1.15	-15.60	-0.83	1.00					
2 hour differences													
80795	1:58	5	-2.68	6.70	-0.14	-17.70	-0.87	-0.29					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
80695	23:58	30	-0.04	0.40	-0.49	-8.70	-0.58	-0.44	temp	0.18	-0.47	-0.16	0.20
80795	0:08	30	-0.37	0.20	1.12	-13.60	-1.03	1.01	humidity	2.90	-1.80	0.21	1.18
80795	0:18	30	-0.47	2.90	-0.55	-10.80	-0.57	-0.77	wind	1.73	-1.14	0.10	0.85
80795	0:28	30	-0.31	-0.70	-0.25	4.80	0.38	-0.12	direction	13.40	-13.60	-1.65	8.28
80795	0:38	30	-0.15	-0.60	-0.06	-5.40	-0.29	-0.18	u	0.59	-1.03	-0.13	0.51
80795	0:48	30	-0.24	0.60	-0.93	3.70	0.54	-0.78	v	1.67	-1.18	0.09	0.83
80795	0:58	30	-0.09	-0.20	0.06	13.40	0.59	0.21					
80795	1:08	30	-0.06	-0.20	0.55	8.60	0.42	0.57					
80795	1:18	30	0.03	0.20	-0.39	4.40	0.21	-0.40					
80795	1:28	30	0.08	-0.50	0.77	-5.20	-0.25	0.78					
80795	1:38	30	-0.46	1.90	-1.14	-10.50	-0.47	-1.18					
80795	1:48	30	-0.12	0.50	0.83	0.20	-0.13	0.82					
80795	1:58	30	0.18	-1.80	1.73	-2.40	-0.50	1.67					
1 hour differences													
80795	0:58	30	-1.63	2.20	-0.61	-7.90	-0.38	-0.63					
80795	1:58	30	-0.35	0.10	2.35	-4.90	-0.72	2.26					
2 hour differences													
80795	1:58	30	-1.98	2.30	1.74	-12.80	-1.10	1.63					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
80695	23:58	44	0.00	0.40	-0.66	-9.40	-0.66	-0.63	temp	0.00	0.00	0.00	0.00
80795	0:08	44	0.00	0.10	1.34	-12.10	-1.09	1.18	humidity	3.40	-3.70	-0.01	1.66
80795	0:18	44	0.00	3.40	-0.59	-5.30	-0.23	-0.69	wind	2.57	-1.16	0.17	1.00
80795	0:28	44	0.00	-1.00	-0.02	4.00	0.29	0.07	direction	14.00	-12.10	-1.37	7.47
80795	0:38	44	0.00	-1.10	-0.31	-8.40	-0.46	-0.50	u	0.81	-1.09	-0.13	0.54
80795	0:48	44	0.00	0.60	-0.65	3.60	0.46	-0.51	v	2.49	-1.19	0.16	0.98
80795	0:58	44	0.00	-0.20	-0.12	14.00	0.81	0.08					
80795	1:08	44	0.00	-0.10	0.69	5.30	0.28	0.71					
80795	1:18	44	0.00	-0.20	-0.17	5.60	0.37	-0.18					
80795	1:28	44	0.00	-0.80	0.64	-4.90	-0.33	0.65					
80795	1:38	44	0.00	2.00	-1.16	-6.50	-0.35	-1.19					
80795	1:48	44	0.00	0.50	0.64	-0.70	-0.13	0.63					
80795	1:58	44	0.00	-3.70	2.57	-3.00	-0.69	2.49					
1 hour differences													
80795	0:58	44	0.00	1.80	-0.35	-4.20	-0.22	-0.37					
80795	1:58	44	0.00	-2.30	3.21	-4.20	-0.85	3.11					
2 hour differences													
80795	1:58	44	0.00	-0.50	2.86	-8.40	-1.07	2.74					

SUNSET 8/7/95

no data available

SUNSET 80895													
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	-0.07	-0.45	-0.21	0.13
80895	23:56	5	-0.14	-0.30	0.38	0.30	0.01	0.38	humidity	2.80	-2.20	0.63	1.30
80995	0:06	5	-0.07	1.00	-0.34	-4.70	-0.15	-0.35	wind	1.75	-0.60	0.21	0.64
80995	0:16	5	-0.17	0.00	0.28	5.50	0.18	0.29	direction	11.30	-30.60	-3.15	10.72
80995	0:26	5	-0.32	1.50	-0.60	2.40	0.05	-0.60	u	0.18	-1.07	-0.23	0.40
80995	0:36	5	-0.29	0.70	0.00	1.50	0.04	-0.01	v	1.72	-0.78	0.13	0.62
80995	0:46	5	-0.07	0.00	0.11	1.10	0.04	0.11					
80995	0:56	5	-0.07	0.00	-0.02	-4.70	-0.13	-0.01					
80995	1:06	5	-0.10	0.10	-0.19	2.30	0.05	-0.19					
80995	1:16	5	-0.14	0.80	0.31	-0.30	0.01	0.31					
80995	1:26	5	-0.45	2.60	0.30	-17.00	-0.57	0.24					
80995	1:36	5	-0.21	2.80	-0.38	-30.60	-0.66	-0.78					
80995	1:46	5	-0.43	1.20	1.16	-8.10	-1.07	0.54					
80995	1:56	5	-0.29	-2.20	1.75	11.30	-0.77	1.72					
1 hour differences													
80995	0:56	5	-0.99	3.20	-0.57	1.10	0.03	-0.57					
80995	1:56	5	-1.62	5.30	2.95	-42.40	-3.01	1.84					
2 hour differences													
80995	1:56	5	-2.61	8.50	2.38	-41.30	-2.98	1.27					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.06	-1.92	-0.21	0.52
80895	23:56	30	-0.13	0.50	-0.23	6.90	0.34	-0.25	humidity	5.90	-1.50	0.72	1.70
80995	0:06	30	-0.01	0.70	-0.71	-0.10	-0.08	-0.70	wind	1.62	-0.71	0.18	0.65
80995	0:16	30	-0.08	-0.50	0.83	9.80	0.58	0.73	direction	9.80	-22.80	-3.10	9.58
80995	0:26	30	-0.13	0.30	-0.31	-3.90	-0.26	-0.26	u	0.58	-1.54	-0.27	0.65
80995	0:36	30	0.06	-1.50	0.52	3.20	0.28	0.47	v	1.03	-0.70	0.08	0.51
80995	0:46	30	-0.11	0.70	0.26	2.80	0.23	0.20					
80995	0:56	30	-0.02	0.10	-0.45	2.50	-0.02	-0.47					
80995	1:06	30	0.00	0.20	-0.43	2.40	-0.05	-0.44					
80995	1:16	30	-0.11	1.00	0.42	-6.30	-0.14	0.50					
80995	1:26	30	-0.10	0.70	-0.11	-13.50	-0.69	0.01					
80995	1:36	30	-0.07	0.10	0.21	-16.50	-0.86	0.13					
80995	1:46	30	-0.13	1.20	0.75	-22.80	-1.54	0.10					
80995	1:56	30	-1.92	5.90	1.62	-4.80	-1.31	1.03					
1 hour differences													
80995	0:56	30	-0.29	-0.20	0.14	14.30	0.73	-0.03					
80995	1:56	30	-2.33	9.10	2.46	-61.50	-4.59	1.33					
2 hour differences													
80995	1:56	30	-2.62	8.90	2.60	-47.20	-3.86	1.30					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.00	0.00	0.00	0.00
80895	23:56	44	0.00	0.60	-0.41	2.80	0.14	-0.42	humidity	6.30	-1.40	0.73	1.82
80995	0:06	44	0.00	1.00	-0.84	0.60	-0.04	-0.84	wind	2.03	-0.84	0.20	0.76
80995	0:16	44	0.00	-0.70	0.99	10.70	0.67	0.88	direction	10.70	-23.10	-3.41	9.02
80995	0:26	44	0.00	0.10	-0.24	-2.70	-0.20	-0.19	u	0.67	-1.85	-0.32	0.73
80995	0:36	44	0.00	-1.40	0.48	0.90	0.16	0.45	v	1.11	-0.84	0.08	0.56
80995	0:46	44	0.00	0.70	0.30	2.80	0.25	0.24					
80995	0:56	44	0.00	0.30	-0.48	2.20	-0.02	-0.49					
80995	1:06	44	0.00	0.20	-0.45	0.50	-0.12	-0.44					
80995	1:16	44	0.00	1.00	0.34	-5.10	-0.16	0.40					
80995	1:26	44	0.00	0.40	-0.10	-8.80	-0.48	-0.01					
80995	1:36	44	0.00	-0.20	0.32	-16.50	-0.94	0.27					
80995	1:46	44	0.00	1.20	0.65	-23.10	-1.61	0.02					
80995	1:56	44	0.00	6.30	2.03	-8.60	-1.85	1.11					
1 hour differences													
80995	0:56	44	0.00	0.00	0.21	14.50	0.82	0.05					
80995	1:56	44	0.00	8.90	2.79	-61.60	-5.16	1.35					
2 hour differences													
80995	1:56	44	0.00	8.90	3.00	-47.10	-4.34	1.40					

SUNSET 80995

date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.28	-0.59	-0.02	0.24
80995	23:55	5	0.24	-1.80	-2.13	16.90	2.52	0.90	humidity	2.40	-1.80	-0.05	1.44
81095	0:05	5	0.04	-1.70	1.35	-13.50	-1.68	-0.69	wind	1.57	-2.21	-0.34	1.32
81095	0:15	5	-0.59	2.10	-0.66	18.30	1.28	1.38	direction	61.80	-63.20	0.13	38.55
81095	0:25	5	-0.37	2.40	-0.97	47.50	3.66	1.44	u	3.70	-2.12	0.34	2.12
81095	0:35	5	0.15	-0.40	-0.54	61.80	3.70	-1.84	v	1.44	-1.84	-0.05	1.14
81095	0:45	5	0.21	-1.40	-2.21	-20.00	-2.12	-1.05					
81095	0:55	5	0.08	0.70	-0.15	-33.90	-0.85	0.07					
81095	1:05	5	-0.04	-1.40	1.57	38.50	1.78	1.02					
81095	1:15	5	0.28	-1.00	0.04	4.00	0.19	-0.09					
81095	1:25	5	-0.08	0.60	-1.94	-47.30	-2.04	-1.27					
81095	1:35	5	-0.07	-0.80	1.28	25.00	0.83	1.18					
81095	1:45	5	0.01	1.30	-0.94	-63.20	-1.68	-1.25					
81095	1:55	5	-0.08	0.70	0.85	-32.40	-1.19	-0.51					
1 hour differences													
81095	0:55	5	-0.48	1.70	-3.18	60.20	3.99	-0.69					
81095	1:55	5	0.02	-0.60	0.86	-75.40	-2.11	-0.92					
2 hour differences													
81095	1:55	5	-0.46	1.10	-2.32	-15.20	1.88	-1.61					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.29	-0.55	0.03	0.27
80995	23:55	30	0.24	-1.70	-3.82	5.50	3.88	-0.17	humidity	2.60	-2.90	-0.35	1.57
81095	0:05	30	0.04	-2.90	2.29	-2.30	-2.28	0.32	wind	2.29	-3.82	-0.53	1.75
81095	0:15	30	-0.42	1.60	-1.22	17.00	1.98	1.62	direction	61.40	-43.20	1.58	29.86
81095	0:25	30	-0.21	0.20	0.04	44.30	4.22	3.20	u	5.72	-2.52	0.55	2.78
81095	0:35	30	0.23	0.60	-1.65	61.40	5.72	-3.12	v	3.20	-3.12	-0.03	1.59
81095	0:45	30	0.29	-1.30	-2.13	-21.10	-2.52	-0.75					
81095	0:55	30	0.14	0.50	-0.46	-6.40	-0.49	-0.30					
81095	1:05	30	0.11	-2.40	1.63	12.20	1.39	1.14					
81095	1:15	30	0.17	-0.20	-0.47	6.40	0.12	-0.66					
81095	1:25	30	0.23	-1.30	-1.40	-18.60	-1.59	-0.70					
81095	1:35	30	0.13	-0.70	1.65	7.10	1.03	1.35					
81095	1:45	30	-0.55	2.60	-1.88	-41.70	-2.50	-1.52					
81095	1:55	30	-0.06	0.50	0.57	-43.20	-1.86	-0.74					
1 hour differences													
81095	0:55	30	0.07	-1.30	-3.13	92.90	6.63	0.97					
81095	1:55	30	0.03	-1.50	0.10	-77.80	-3.41	-1.13					
2 hour differences													
81095	1:55	30	0.10	-2.80	-3.03	15.10	3.22	-0.16					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.00	0.00	0.00	0.00
80995	23:55	44	0.00	-1.30	-3.93	3.80	3.97	-0.22	humidity	2.90	-3.40	-0.40	1.78
81095	0:05	44	0.00	-3.40	1.78	0.60	-1.71	0.51	wind	1.78	-3.93	-0.60	1.81
81095	0:15	44	0.00	1.80	-1.41	15.50	2.12	1.51	direction	59.70	-36.10	2.53	27.20
81095	0:25	44	0.00	-1.70	1.12	40.20	3.51	4.35	u	6.65	-2.64	0.65	2.82
81095	0:35	44	0.00	1.60	-2.73	59.70	6.65	-3.55	v	4.35	-3.55	0.02	1.86
81095	0:45	44	0.00	-0.90	-1.86	-18.60	-2.29	-0.78					
81095	0:55	44	0.00	0.40	-0.70	-6.20	-0.59	-0.55					
81095	1:05	44	0.00	-2.10	1.61	12.40	1.40	1.18					
81095	1:15	44	0.00	-0.30	-0.33	6.70	0.30	-0.56					
81095	1:25	44	0.00	-2.00	-0.95	-18.00	-1.55	-0.32					
81095	1:35	44	0.00	-0.30	1.43	8.20	1.07	1.13					
81095	1:45	44	0.00	2.90	-2.19	-36.10	-2.64	-1.81					
81095	1:55	44	0.00	0.10	0.40	-35.30	-1.78	-0.58					
1 hour differences													
81095	0:55	44	0.00	-2.20	-3.80	91.20	7.69	1.49					
81095	1:55	44	0.00	-1.70	-0.03	-62.10	-3.20	-0.96					
2 hour differences													
81095	1:55	44	0.00	-3.90	-3.83	29.10	4.49	0.53					

SUNSET 81095

date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences													
81095	23:54	5	-1.06	8.10	1.09	-3.00	0.76	-0.79	temp	1.47	-1.76	-0.22	0.84
81195	0:04	5	-1.76	3.90	0.51	0.20	0.31	-0.41	humidity	12.60	-18.20	0.86	7.20
81195	0:14	5	-1.16	-4.50	-1.10	-2.30	-0.61	0.93	wind	1.31	-1.58	-0.07	0.81
81195	0:24	5	0.25	4.40	-1.58	-84.00	-0.87	2.39	direction	38.60	-84.00	-19.62	35.93
81195	0:34	5	0.31	0.00	-0.41	-34.00	-0.56	-0.05	u	2.16	-1.24	-0.13	0.90
81195	0:44	5	-0.02	0.40	0.16	-82.00	-0.81	-0.61	v	2.39	-1.07	0.05	1.00
81195	0:54	5	1.47	-18.20	1.31	-4.10	-1.24	-0.44					
81195	1:04	5	-1.04	12.60	0.12	38.60	-0.07	1.34					
81195	1:14	5	-0.27	1.40	0.20	9.20	-0.03	0.40					
81195	1:24	5	0.04	0.50	-0.64	-27.50	0.33	-1.07					
81195	1:34	5	0.27	-2.50	0.19	-21.90	-0.09	-0.68					
81195	1:44	5	-0.02	2.70	-0.53	-51.60	2.16	-0.63					
81195	1:54	5	0.11	2.40	-0.20	7.30	-0.92	0.25					
1 hour differences													
81195	0:54	5	-0.91	-14.00	-1.11	34.00	-3.78	1.81					
81195	1:54	5	-0.91	17.10	-0.86	-45.90	1.38	-0.39					
2 hour differences													
81195	1:54	5	-1.82	3.10	-1.97	-11.90	-2.40	1.42					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences													
81095	23:54	30	-0.86	5.80	2.06	-2.90	1.26	-1.63	temp	2.60	-1.80	-0.30	1.15
81195	0:04	30	-1.80	4.00	0.76	-14.40	1.30	0.16	humidity	9.00	-21.00	1.65	8.89
81195	0:14	30	-0.50	-4.30	-1.98	-6.70	-1.32	1.53	wind	2.06	-1.98	0.19	1.27
81195	0:24	30							direction	44.10	-34.20	-3.62	20.67
81195	0:34	30							u	2.06	-1.55	-0.01	1.24
81195	0:44	30							v	1.53	-1.63	-0.10	0.85
81195	0:54	30	2.60	-21.00	-0.44	8.40	-0.89	0.40					
81195	1:04	30	-0.85	9.00	1.41	44.10	-1.55	0.31					
81195	1:14	30	-0.98	7.30	1.07	7.30	-1.05	0.36					
81195	1:24	30	-0.03	3.10	-0.27	-13.70	0.27	-0.67					
81195	1:34	30	-0.39	8.80	0.59	-12.30	-0.42	-0.76					
81195	1:44	30	-0.23	2.60	-1.53	-34.20	2.06	-0.31					
81195	1:54	30	0.00	1.20	0.18	-11.80	0.23	-0.35					
1 hour differences													
81195	0:54	30	0.55	-27.20	-3.40	9.90	-2.57	2.83					
81195	1:54	30	-2.48	32.00	1.45	-20.60	-0.46	-1.42					
2 hour differences													
81195	1:54	30	-1.93	4.80	-1.95	-10.70	-3.03	1.41					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences													
81095	23:54	42	-0.82	5.80	2.14	5.30	1.19	-1.80	temp	1.71	-1.72	-0.21	0.91
81195	0:04	42	-1.72	2.90	1.22	-18.00	1.85	0.22	humidity	9.30	-13.30	0.82	6.67
81195	0:14	42	0.15	-4.20	-1.99	-7.50	-1.44	1.48	wind	2.14	-2.13	0.03	1.39
81195	0:24	42	1.29	-4.10	-0.61	-29.70	-0.27	1.56	direction	68.80	-56.00	-5.23	30.30
81195	0:34	42	0.07	-2.40	-0.73	16.00	-0.78	-0.55	u	2.11	-2.14	-0.17	1.34
81195	0:44	42	-0.74	-13.30	0.43	9.00	0.32	-0.44	v	1.56	-1.80	-0.05	0.96
81195	0:54	42	1.71	-7.00	-2.13	-56.00	-2.14	0.71					
81195	1:04	42	-0.55	6.10	1.07	68.80	-1.16	-0.05					
81195	1:14	42	-0.87	5.50	1.86	17.50	-1.85	0.64					
81195	1:24	42	-0.40	8.60	0.25	-18.30	-0.23	-1.02					
81195	1:34	42	-0.59	9.30	0.40	-7.90	-0.27	-0.57					
81195	1:44	42	-0.24	2.20	-1.63	-29.10	2.11	-0.39					
81195	1:54	42	-0.06	1.20	0.11	-18.10	0.50	-0.46					
1 hour differences													
81195	0:54	42	0.76	-28.10	-3.81	-25.80	-2.46	2.98					
81195	1:54	42	-2.71	32.90	2.06	12.90	-0.90	-1.85					
2 hour differences													
81195	1:54	42	-1.95	4.80	-1.75	-12.90	-3.36	1.13					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81195	23:53	5	-0.21	0.90	0.15	-24.70	0.14	0.84	temp	0.11	-1.27	-0.27	0.35
81295	0:03	5	-0.08	-0.70	0.04	7.00	0.08	-0.24	humidity	7.90	-1.40	1.44	2.47
81295	0:13	5	-0.22	1.20	-0.44	-11.20	-0.50	0.27	wind	1.74	-0.87	0.17	0.64
81295	0:23	5	-0.01	0.00	0.35	-9.20	0.22	0.40	direction	20.00	-60.50	-10.12	22.58
81295	0:33	5	-0.39	1.50	-0.05	1.20	-0.03	-0.06	u	0.60	-2.67	-0.30	0.84
81295	0:43	5	-0.04	-1.40	-0.16	1.60	-0.12	-0.11	v	1.30	-0.65	0.31	0.54
81295	0:53	5	0.00	-0.40	-0.87	20.00	-0.73	-0.65					
81295	1:03	5	0.11	0.00	0.24	-0.90	0.24	0.03					
81295	1:13	5	-0.44	3.20	0.30	-7.90	0.27	0.22					
81295	1:23	5	-0.14	0.90	-0.22	-60.50	-1.05	0.87					
81295	1:33	5	-0.50	4.20	0.26	-16.10	-0.33	0.32					
81295	1:43	5	-0.31	1.40	0.92	13.90	0.60	0.83					
81295	1:53	5	-1.27	7.90	1.74	-44.70	-2.67	1.30					
1 hour differences													
81295	0:53	5	-0.74	0.20	-1.13	9.40	-1.08	-0.39					
81295	1:53	5	-2.55	17.60	3.24	-116.20	-2.94	3.57					
2 hour differences													
81295	1:53	5	-3.29	17.80	2.11	-106.80	-4.02	3.18					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81195	23:53	30	-0.15	1.70	0.02	-18.40	-0.04	0.69	temp	0.25	-2.48	-0.25	0.68
81295	0:03	30	0.00	-2.10	0.53	13.30	0.60	-0.49	humidity	13.70	-5.40	1.43	4.33
81295	0:13	30	-0.04	0.20	-0.19	-11.30	-0.25	0.49	wind	3.83	-1.18	0.32	1.18
81295	0:23	30	-0.20	1.90	0.16	-13.40	-0.05	0.62	direction	22.00	-71.70	-9.55	23.19
81295	0:33	30	-0.06	-0.60	-0.09	1.80	-0.04	-0.11	u	0.66	-4.77	-0.41	1.39
81295	0:43	30	0.25	-5.40	0.17	6.40	0.26	-0.22	v	3.59	-0.95	0.43	1.10
81295	0:53	30	-0.16	2.50	-1.18	22.00	-1.05	-0.95					
81295	1:03	30	-0.19	3.60	0.12	-4.70	0.12	0.13					
81295	1:13	30	-0.07	1.30	0.13	-2.50	0.13	0.08					
81295	1:23	30	-0.09	1.30	-0.30	-32.00	-0.57	0.78					
81295	1:33	30	-0.05	0.60	-0.24	-6.40	-0.29	-0.03					
81295	1:43	30	-0.01	-0.10	1.16	-7.30	0.66	0.99					
81295	1:53	30	-2.48	13.70	3.83	-71.70	-4.77	3.59					
1 hour differences													
81295	0:53	30	-0.21	-3.50	-0.60	18.80	-0.53	-0.66					
81295	1:53	30	-2.89	20.40	4.70	-124.60	-4.72	5.54					
2 hour differences													
81295	1:53	30	-3.10	16.90	4.10	-105.80	-5.25	4.88					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81195	23:53	42	-0.16	1.50	0.15	-19.30	-0.03	0.79	temp	0.31	-2.45	-0.24	0.68
81295	0:03	42	0.04	-2.30	0.56	18.50	0.74	-0.70	humidity	13.30	-6.10	1.35	4.43
81295	0:13	42	-0.02	0.10	-0.10	-10.20	-0.19	0.49	wind	3.99	-1.15	0.33	1.21
81295	0:23	42	-0.21	2.00	-0.13	-14.00	-0.37	0.58	direction	18.90	-72.50	-9.17	23.37
81295	0:33	42	0.01	-1.60	0.36	2.80	0.39	0.04	u	0.74	-5.17	-0.44	1.50
81295	0:43	42	0.31	-6.10	-0.05	7.50	0.10	-0.39	v	3.51	-0.97	0.41	1.10
81295	0:53	42	-0.23	3.90	-1.15	18.90	-0.99	-0.97					
81295	1:03	42	-0.18	2.40	0.25	-3.50	0.25	0.13					
81295	1:13	42	-0.09	2.40	-0.01	-2.50	-0.02	0.09					
81295	1:23	42	-0.10	2.00	-0.33	-28.10	-0.62	0.78					
81295	1:33	42	0.02	-0.10	-0.25	-9.60	-0.37	0.06					
81295	1:43	42	-0.03	0.00	1.01	-7.20	0.50	0.91					
81295	1:53	42	-2.45	13.30	3.99	-72.50	-5.17	3.51					
1 hour differences													
81295	0:53	42	-0.10	-4.00	-0.51	23.50	-0.32	-0.95					
81295	1:53	42	-2.83	20.00	4.66	-123.40	-5.43	5.48					
2 hour differences													
81295	1:53	42	-2.93	16.00	4.15	-99.90	-5.75	4.53					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	1.53	-0.90	-0.08	0.59
0	23:52	5							humidity	6.90	-9.90	0.06	4.12
81395	0:02	5							wind	0.65	-0.62	-0.11	0.47
81395	0:12	5	-0.07	-1.80	0.37	-8.20	0.45	0.12	direction	33.50	-119.60	-7.84	42.88
81395	0:22	5	-0.41	3.70	-0.48	-22.80	-0.36	0.82	u	0.64	-1.99	-0.12	0.79
81395	0:32	5	-0.17	0.40	-0.62	16.20	-0.64	-0.35	v	0.82	-0.35	0.12	0.41
81395	0:42	5	0.07	-1.90	0.65	-0.50	0.63	-0.12					
81395	0:52	5	-0.15	1.10	-0.62	-10.70	-0.58	0.33					
81395	1:02	5	-0.24	1.20	0.19	4.80	0.18	-0.11					
81395	1:12	5	-0.17	1.10	-0.33	23.90	-0.45	-0.35					
81395	1:22	5	-0.24	-0.10	0.51	-33.60	0.64	0.58					
81395	1:32	5	-0.90	6.90	-0.56	-119.60	-1.99	0.67					
81395	1:42	5	1.53	-9.90	-0.28	33.50	0.51	-0.13					
81395	1:52	5	-0.11	0.00	-0.03	30.80	0.31	-0.12					
1 hour differences													
81395	0:52	5											
81395	1:52	5	-0.13	-0.80	-0.50	-60.20	-0.80	0.54					
2 hour differences													
81395	1:52	5											
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.48	-0.94	-0.06	0.34
0	23:52	30							humidity	6.80	-3.30	0.18	2.54
81395	0:02	30							wind	0.70	-1.35	-0.22	0.54
81395	0:12	30	-0.02	0.20	-0.18	-1.90	-0.15	0.12	direction	216.90	-90.10	6.86	76.47
81395	0:22	30	-0.17	1.00	-0.19	-3.40	-0.17	0.16	u	0.66	-1.80	-0.21	0.66
81395	0:32	30	-0.15	0.60	-0.53	8.60	-0.57	-0.14	v	1.50	-0.78	0.05	0.61
81395	0:42	30	0.08	-1.50	0.70	0.50	0.66	-0.23					
81395	0:52	30	-0.13	0.90	-0.37	-6.50	-0.30	0.32					
81395	1:02	30	-0.03	0.10	-0.02	3.00	-0.04	-0.09					
81395	1:12	30	0.00	-0.70	0.38	19.40	0.06	-0.78					
81395	1:22	30	0.07	-1.50	-0.03	-15.50	0.23	0.55					
81395	1:32	30	-0.94	6.80	-1.35	-90.10	-1.80	1.50					
81395	1:42	30	0.48	-3.30	-0.09	-55.50	-0.72	-0.20					
81395	1:52	30	0.12	-0.60	-0.73	216.90	0.45	-0.62					
1 hour differences													
81395	0:52	30											
81395	1:52	30	-0.30	0.80	-1.84	78.20	-1.82	0.36					
2 hour differences													
81395	1:52	30											
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.16	-0.55	-0.05	0.19
0	23:52	44							humidity	4.20	-1.40	0.20	1.52
81395	0:02	42							wind	0.45	-1.01	-0.23	0.45
81395	0:12	42	-0.02	-0.10	-0.34	0.20	-0.34	0.06	direction	12.20	-144.30	-18.95	44.95
81395	0:22	42	-0.12	1.10	-0.19	1.00	-0.19	0.00	u	0.82	-2.35	-0.26	0.81
81395	0:32	42	-0.14	0.00	-0.10	2.80	-0.12	-0.08	v	0.84	-0.70	0.04	0.47
81395	0:42	42	0.06	-0.90	0.45	1.70	0.41	-0.19					
81395	0:52	42	0.00	-0.60	-0.26	-2.90	-0.22	0.19					
81395	1:02	42	-0.12	1.10	-0.07	2.30	-0.09	-0.07					
81395	1:12	42	-0.02	-0.40	0.39	12.20	0.16	-0.62					
81395	1:22	42	0.11	-1.40	-0.32	-8.20	-0.14	0.45					
81395	1:32	42	-0.55	4.20	-0.91	-22.40	-0.77	0.84					
81395	1:42	42	0.05	-0.40	-0.19	-144.30	-2.35	0.60					
81395	1:52	42	0.16	-0.40	-1.01	-50.90	0.82	-0.70					
1 hour differences													
81395	0:52	42											
81395	1:52	42	-0.37	2.70	-2.11	-211.30	-2.37	0.50					
2 hour differences													
81395	1:52	42											

SUNSET 81395

date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.23	-0.69	-0.18	0.26
81395	23:51	5	-0.17	0.30	-0.07	-16.00	-0.46	-0.15	humidity	7.00	-2.90	0.79	2.65
81495	0:01	5	-0.26	2.50	-0.37	8.40	0.30	-0.31	wind	0.41	-0.37	0.00	0.23
81495	0:11	5	-0.04	-0.70	-0.34	5.10	0.14	-0.32	direction	16.30	-18.50	-2.70	11.24
81495	0:21	5	-0.12	0.00	0.28	10.50	0.21	0.27	u	0.44	-0.57	-0.08	0.32
81495	0:31	5	-0.58	4.30	0.22	-8.30	-0.19	0.23	v	0.37	-0.37	-0.03	0.27
81495	0:41	5	-0.11	-0.40	0.12	-8.60	-0.24	0.09					
81495	0:51	5	-0.01	0.10	0.41	-5.10	-0.25	0.37					
81495	1:01	5	-0.38	1.70	-0.05	0.50	0.03	-0.05					
81495	1:11	5	-0.23	0.40	-0.05	-13.80	-0.41	-0.22					
81495	1:21	5	-0.69	7.00	0.11	-18.50	-0.57	-0.30					
81495	1:31	5	0.11	-2.50	0.01	16.30	0.44	0.37					
81495	1:41	5	0.23	-2.90	-0.10	6.30	0.24	0.01					
81495	1:51	5	-0.06	0.50	-0.21	-11.90	-0.22	-0.37					
1 hour differences													
81495	0:51	5	-1.12	5.80	0.32	2.00	-0.03	0.33					
81495	1:51	5	-1.02	4.20	-0.29	-21.10	-0.49	-0.56					
2 hour differences													
81495	1:51	5	-2.14	10.00	0.03	-19.10	-0.52	-0.23					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.24	-0.24	-0.07	0.12
81395	23:51	30	-0.20	0.80	-0.51	-7.70	-0.20	-0.56	humidity	1.90	-2.10	0.25	1.09
81495	0:01	30	-0.02	0.30	-0.11	11.90	0.40	-0.05	wind	1.04	-0.68	0.07	0.44
81495	0:11	30	-0.24	1.40	-0.68	1.40	0.05	-0.68	direction	11.90	-10.30	-1.82	7.18
81495	0:21	30	-0.01	-0.50	0.32	-4.20	-0.11	0.32	u	0.40	-0.58	-0.11	0.34
81495	0:31	30	-0.08	0.20	1.04	-6.80	-0.38	0.99	v	0.99	-0.68	0.04	0.45
81495	0:41	30	0.24	-2.10	-0.06	-2.30	-0.08	-0.08					
81495	0:51	30	-0.04	-0.90	0.50	2.20	-0.01	0.51					
81495	1:01	30	-0.06	0.80	0.09	-1.00	-0.07	0.08					
81495	1:11	30	-0.12	1.90	0.03	-10.30	-0.53	-0.14					
81495	1:21	30	-0.12	-0.40	0.24	-9.10	-0.56	-0.02					
81495	1:31	30	-0.15	0.60	0.23	9.00	0.37	0.45					
81495	1:41	30	0.01	-0.20	-0.30	3.40	0.30	-0.21					
81495	1:51	30	-0.16	1.40	0.12	-10.10	-0.58	-0.13					
1 hour differences													
81495	0:51	30	-0.15	-1.60	1.01	2.20	-0.13	1.01					
81495	1:51	30	-0.60	4.10	0.41	-18.10	-1.07	0.03					
2 hour differences													
81495	1:51	30	-0.75	2.50	1.42	-15.90	-1.20	1.04					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.12	-0.22	-0.06	0.09
81395	23:51	42	-0.18	0.80	-0.57	-5.80	-0.10	-0.60	humidity	1.60	-1.50	0.27	0.99
81495	0:01	42	-0.01	-0.10	0.02	12.60	0.45	0.10	wind	1.07	-0.74	0.06	0.47
81495	0:11	42	-0.22	1.60	-0.74	0.50	0.06	-0.74	direction	12.60	-10.60	-1.55	7.46
81495	0:21	42	-0.02	-0.40	0.42	-4.70	-0.17	0.40	u	0.49	-0.68	-0.10	0.38
81495	0:31	42	0.12	-1.50	1.07	-5.40	-0.41	1.01	v	1.01	-0.74	0.03	0.48
81495	0:41	42	0.04	-0.20	-0.25	-2.60	-0.06	-0.27					
81495	0:51	42	-0.01	-0.80	0.44	3.70	0.07	0.47					
81495	1:01	42	-0.07	0.60	0.07	-1.30	-0.08	0.05					
81495	1:11	42	-0.08	1.40	0.11	-9.50	-0.54	-0.06					
81495	1:21	42	-0.07	0.00	0.28	-10.60	-0.68	-0.05					
81495	1:31	42	-0.07	-0.60	0.22	10.60	0.49	0.51					
81495	1:41	42	-0.10	1.30	-0.29	2.90	0.27	-0.20					
81495	1:51	42	-0.08	1.40	0.06	-10.50	-0.60	-0.22					
1 hour differences													
81495	0:51	42	-0.10	-1.40	0.96	4.10	-0.06	0.97					
81495	1:51	42	-0.47	4.10	0.45	-18.40	-1.14	0.03					
2 hour differences													
81495	1:51	42	-0.57	2.70	1.41	-14.30	-1.20	1.00					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81495	23:50	5	-0.25	1.80	-1.42	17.90	0.57	-1.55	temp	0.08	-0.66	-0.22	0.24
81595	0:00	5	-0.12	0.90	-0.01	-18.90	-0.69	0.13	humidity	3.50	-1.30	1.22	1.58
81595	0:10	5	-0.26	1.90	-0.18	-12.00	-0.41	-0.21	wind	0.81	-1.42	-0.14	0.60
0	0:20	5							direction	17.90	-23.00	-5.41	15.14
0	0:30	5							u	0.57	-0.75	-0.21	0.46
0	0:40	5							v	0.39	-1.55	-0.17	0.62
81595	0:50	5											
81595	1:00	5	-0.32	1.40	-0.14	-16.00	-0.50	-0.15					
81595	1:10	5	-0.09	0.80	-0.20	-11.00	-0.25	-0.28					
81595	1:20	5	-0.42	2.90	-0.39	-23.00	-0.25	-0.61					
81595	1:30	5	-0.66	3.50	0.81	-8.20	-0.75	0.38					
81595	1:40	5	0.07	-0.90	0.00	16.20	0.40	0.38					
81595	1:50	5	0.08	-1.30	0.31	6.30	0.03	0.39					
1 hour differences													
81595	0:50	5	-1.11	4.20	-0.25	-14.70	-0.56	-0.12					
81595	1:50	5	-1.34	6.40	0.39	-35.70	-1.32	0.11					
2 hour differences													
81595	1:50	5	-2.45	10.60	0.14	-50.40	-1.88	-0.01					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81495	23:50	30	-0.11	1.10	-1.16	2.60	-0.10	-1.16	temp	0.08	-0.25	-0.13	0.11
81595	0:00	30	-0.19	1.20	0.22	-9.50	-0.50	0.31	humidity	1.40	-1.60	0.68	0.91
81595	0:10	30	-0.17	0.80	-0.61	-9.10	-0.50	-0.61	wind	0.86	-1.16	-0.09	0.57
0	0:20	30							direction	8.70	-14.80	-5.96	7.76
0	0:30	30							u	0.31	-0.79	-0.37	0.34
0	0:40	30							v	0.94	-1.16	-0.07	0.59
81595	0:50	30											
81595	1:00	30	-0.21	1.00	-0.23	-14.80	-0.79	-0.04					
81595	1:10	30	-0.22	0.70	0.06	-2.50	-0.12	0.06					
81595	1:20	30	0.00	0.30	-0.24	-14.50	-0.68	-0.28					
81595	1:30	30	-0.07	1.40	0.26	-5.70	-0.33	0.19					
81595	1:40	30	0.08	-1.60	0.86	8.70	0.31	0.94					
81595	1:50	30	-0.25	1.20	0.05	-8.80	-0.58	-0.08					
1 hour differences													
81595	0:50	30	-0.53	1.60	-0.12	6.00	0.27	-0.22					
81595	1:50	30	-0.67	3.00	0.76	-37.60	-2.19	0.79					
2 hour differences													
81595	1:50	30	-1.20	4.60	0.64	-31.60	-1.92	0.57					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81495	23:50	42	-0.10	0.80	-1.10	1.80	-0.09	-1.10	temp	0.09	-0.30	-0.11	0.11
81595	0:00	42	-0.19	1.00	0.39	-5.70	-0.28	0.44	humidity	1.50	-1.90	0.54	0.99
81595	0:10	42	-0.12	0.40	-0.60	-7.00	-0.45	-0.58	wind	0.81	-1.10	-0.07	0.55
0	0:20	42							direction	7.60	-13.10	-4.93	6.71
0	0:30	42							u	0.32	-0.75	-0.32	0.34
0	0:40	42							v	0.88	-1.10	-0.06	0.57
81595	0:50	42											
81595	1:00	42	-0.16	0.70	-0.07	-13.10	-0.75	0.09					
81595	1:10	42	-0.16	0.40	0.12	-0.70	-0.03	0.12					
81595	1:20	42	-0.02	0.70	-0.31	-12.10	-0.67	-0.33					
81595	1:30	42	-0.07	1.30	0.08	-6.50	-0.36	0.02					
81595	1:40	42	0.09	-1.90	0.81	7.60	0.32	0.88					
81595	1:50	42	-0.30	1.50	0.01	-8.70	-0.59	-0.11					
1 hour differences													
81595	0:50	42	-0.44	1.20	0.00	6.40	0.36	-0.10					
81595	1:50	42	-0.62	2.70	0.64	-33.50	-2.08	0.67					
2 hour differences													
81595	1:50	42	-1.06	3.90	0.64	-27.10	-1.72	0.57					

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date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.01	-1.09	-0.26	0.36
0	23:49	5							humidity	6.00	-0.10	1.38	1.94
0	23:59	5							wind	0.46	-0.42	-0.04	0.32
0	0:09	5							direction	17.50	-43.20	-9.82	18.86
81695	0:19	5							u	0.51	-0.95	-0.20	0.47
81695	0:29	5	-0.06	-0.10	0.45	7.90	0.51	0.01	v	0.35	-0.38	0.02	0.22
81695	0:39	5	-0.28	1.50	-0.26	4.80	-0.19	-0.24					
81695	0:49	5	0.01	0.10	-0.05	-3.60	-0.08	0.08					
81695	0:59	5	-0.55	2.70	-0.10	-17.50	-0.34	0.35					
81695	1:09	5	-0.12	1.00	-0.29	-26.30	-0.67	0.14					
81695	1:19	5	-0.17	0.50	0.11	-8.80	-0.15	0.17					
81695	1:29	5	-0.08	0.70	-0.42	-19.20	-0.41	-0.38					
81695	1:39	5	-1.09	6.00	0.46	-43.20	-0.95	0.00					
81695	1:49	5	0.00	0.00	-0.26	17.50	0.46	0.04					
1 hour differences													
81695	0:49	5											
81695	1:49	5	-2.01	10.90	-0.50	-97.50	-2.06	0.32					
2 hour differences													
81695	1:49	5											
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.03	-0.21	-0.09	0.09
0	23:49	30							humidity	1.50	-0.80	0.61	0.81
0	23:59	30							wind	0.35	-0.52	-0.10	0.27
0	0:09	30							direction	6.90	-23.00	-3.39	9.01
81695	0:19	30							u	0.23	-0.86	-0.15	0.36
81695	0:29	30	-0.08	0.00	0.35	-4.10	0.23	0.33	v	0.33	-0.26	0.02	0.16
81695	0:39	30	-0.08	0.80	0.04	6.30	0.17	-0.26					
81695	0:49	30	-0.10	1.30	-0.19	-1.30	-0.20	-0.02					
81695	0:59	30	-0.21	1.30	-0.22	-0.10	-0.20	-0.09					
81695	1:09	30	-0.17	1.30	-0.30	-7.20	-0.40	0.11					
81695	1:19	30	-0.03	-0.80	-0.27	-8.10	-0.38	0.07					
81695	1:29	30	0.00	0.20	0.16	0.10	0.12	0.10					
81695	1:39	30	-0.21	1.50	-0.52	-23.00	-0.86	0.04					
81695	1:49	30	0.03	-0.10	0.03	6.90	0.17	-0.07					
1 hour differences													
81695	0:49	30											
81695	1:49	30	-0.59	3.40	-1.12	-31.40	-1.55	0.16					
2 hour differences													
81695	1:49	30											
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	-0.03	-0.18	-0.08	0.05
0	23:49	44							humidity	1.30	-0.70	0.51	0.72
0	23:59	44							wind	0.13	-0.56	-0.12	0.23
0	0:09	42							direction	7.10	-15.50	-3.73	6.46
81695	0:19	42							u	0.16	-0.81	-0.19	0.31
81695	0:29	42	-0.03	-0.40	0.08	-5.70	-0.07	0.30	v	0.30	-0.34	0.03	0.20
81695	0:39	42	-0.08	1.00	-0.02	7.10	0.16	-0.34					
81695	0:49	42	-0.11	1.10	-0.09	-1.00	-0.10	0.01					
81695	0:59	42	-0.18	1.30	0.07	0.80	0.08	-0.01					
81695	1:09	42	-0.10	0.90	-0.32	-3.60	-0.37	0.01					
81695	1:19	42	-0.04	-0.70	-0.33	-9.00	-0.49	0.15					
81695	1:29	42	-0.04	0.30	0.13	-6.40	-0.08	0.29					
81695	1:39	42	-0.08	1.00	-0.56	-15.50	-0.81	-0.08					
81695	1:49	42	-0.07	0.10	-0.04	-0.30	-0.03	-0.03					
1 hour differences													
81695	0:49	42											
81695	1:49	42	-0.51	2.90	-1.05	-34.00	-1.70	0.33					
2 hour differences													
81695	1:49	42											

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)						
10 minute differences									temp	0.36	-1.65	-0.29	0.61
81695	23:48	5	0.00	-0.70	0.49	7.90	0.05	0.54	humidity	15.50	-3.80	1.45	4.82
81695	23:58	5	0.13	-0.20	-0.55	-16.60	-0.21	-0.69	wind	0.58	-0.55	0.03	0.38
81795	0:08	5	-0.35	0.40	0.33	10.50	0.10	0.42	direction	42.60	-34.30	2.65	18.31
81795	0:18	5	-0.04	0.40	0.02	3.90	0.10	0.06	u	1.09	-0.54	0.07	0.43
81795	0:28	5	-0.06	0.30	-0.37	-10.50	-0.11	-0.45	v	0.54	-0.69	0.03	0.43
81795	0:38	5	-1.47	15.50	-0.03	-34.30	-0.53	-0.58					
81795	0:48	5	0.36	-3.80	-0.20	14.10	0.34	0.13					
81795	0:58	5	-0.17	-0.30	-0.10	2.50	0.10	-0.03					
81795	1:08	5	-0.60	3.20	0.58	-7.00	-0.54	0.25					
81795	1:18	5	-0.10	-1.20	-0.28	16.20	0.48	0.10					
81795	1:28	5	0.04	0.10	0.52	5.70	-0.16	0.51					
81795	1:38	5	0.11	-1.00	-0.39	-0.60	0.19	-0.34					
81795	1:48	5	-1.65	6.10	0.33	42.60	1.09	0.52					
1 hour differences													
81795	0:48	5	-1.43	12.60	-0.80	-32.90	-0.31	-1.11					
81795	1:48	5	-2.37	6.90	0.66	59.40	1.16	1.01					
2 hour differences													
81795	1:48	5	-3.80	19.50	-0.14	26.50	0.85	-0.10					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)						
10 minute differences									temp	0.04	-0.56	-0.15	0.18
81695	23:48	30	0.01	-0.10	0.63	8.30	-0.06	0.66	humidity	3.80	-0.90	0.88	1.56
81695	23:58	30	0.00	-0.30	-0.34	-12.90	-0.19	-0.48	wind	0.69	-1.09	0.05	0.48
81795	0:08	30	-0.13	-0.10	0.17	3.30	-0.01	0.19	direction	13.90	-19.70	0.24	9.15
81795	0:18	30	-0.01	0.30	-0.12	1.20	0.09	-0.08	u	1.10	-0.70	-0.02	0.46
81795	0:28	30	0.00	-0.60	-0.18	-1.30	0.06	-0.17	v	0.66	-0.56	0.05	0.34
81795	0:38	30	-0.28	1.50	0.03	4.60	0.09	0.08					
81795	0:48	30	-0.30	3.60	0.28	-19.70	-0.61	-0.11					
81795	0:58	30	0.04	-0.50	0.69	-7.40	-0.70	0.23					
81795	1:08	30	-0.21	1.90	-0.01	-0.20	0.00	-0.01					
81795	1:18	30	-0.23	1.90	0.34	7.30	-0.05	0.47					
81795	1:28	30	0.03	-0.90	0.51	-0.70	-0.40	0.32					
81795	1:38	30	-0.25	1.00	-0.26	6.70	0.45	0.07					
81795	1:48	30	-0.56	3.80	-1.09	13.90	1.10	-0.56					
1 hour differences													
81795	0:48	30	-0.72	4.40	-0.16	-24.80	-0.57	-0.57					
81795	1:48	30	-1.18	7.20	0.18	19.60	0.40	0.52					
2 hour differences													
81795	1:48	30	-1.90	11.60	0.02	-5.20	-0.17	-0.05					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)						
10 minute differences									temp	0.05	-0.30	-0.10	0.12
81695	23:48	42	0.02	0.30	0.52	3.40	-0.19	0.49	humidity	3.60	-0.70	0.72	1.27
81695	23:58	42	-0.01	-0.70	-0.34	-4.60	0.06	-0.37	wind	1.02	-0.77	0.06	0.45
81795	0:08	42	-0.11	0.20	0.11	1.60	-0.02	0.12	direction	6.80	-13.10	-0.25	6.11
81795	0:18	42	0.00	0.10	-0.10	2.30	0.11	-0.04	u	0.72	-1.10	-0.05	0.43
81795	0:28	42	0.01	-0.60	-0.14	-2.00	0.03	-0.15	v	0.49	-0.40	0.05	0.29
81795	0:38	42	-0.21	1.00	0.22	1.40	-0.09	0.21					
81795	0:48	42	-0.30	3.60	0.06	-13.10	-0.36	-0.23					
81795	0:58	42	-0.03	-0.10	1.02	-11.40	-1.10	0.26					
81795	1:08	42	-0.03	0.80	-0.29	0.20	0.25	-0.15					
81795	1:18	42	-0.24	1.20	0.52	2.80	-0.35	0.41					
81795	1:28	42	0.05	-0.20	0.19	3.50	-0.03	0.27					
81795	1:38	42	-0.24	0.80	-0.16	6.80	0.38	0.18					
81795	1:48	42	-0.23	2.90	-0.77	5.80	0.72	-0.40					
1 hour differences													
81795	0:48	42	-0.62	3.60	-0.19	-14.40	-0.27	-0.46					
81795	1:48	42	-0.72	5.40	0.51	7.70	-0.13	0.57					
2 hour differences													
81795	1:48	42	-1.34	9.00	0.32	-6.70	-0.40	0.11					

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date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.78	-0.38	-0.04	0.32
81795	23:47	5	0.78	-5.60	-0.62	-26.80	-1.47	-0.41	humidity	3.40	-5.60	0.30	2.57
81795	23:57	5	-0.19	3.40	-1.13	-10.90	-0.18	-1.19	wind	0.57	-1.13	-0.15	0.49
81895	0:07	5	-0.12	-0.20	-0.20	-17.40	-0.32	-0.37	direction	22.30	-26.80	-6.70	16.08
81895	0:17	5	0.04	0.20	-0.49	22.30	0.59	-0.27	u	0.71	-1.47	-0.19	0.52
81895	0:27	5	-0.04	-2.00	0.40	-5.50	-0.20	0.36	v	0.40	-1.19	-0.20	0.42
81895	0:37	5	0.06	1.90	0.02	-22.60	-0.46	-0.22					
81895	0:47	5	-0.38	3.10	-0.29	-21.60	-0.06	-0.52					
81895	0:57	5	-0.32	1.90	0.05	-10.70	-0.12	-0.16					
81895	1:07	5	-0.10	1.70	-0.71	12.20	0.71	-0.15					
81895	1:17	5	-0.37	0.70	0.32	-13.00	-0.34	0.02					
81895	1:27	5	0.06	-0.30	0.19	19.00	-0.05	0.31					
81895	1:37	5	0.36	-3.00	0.57	3.30	-0.41	0.40					
81895	1:47	5	-0.29	2.10	-0.04	-15.40	-0.17	-0.34					
1 hour differences													
81895	0:47	5	-0.63	6.40	-1.69	-55.70	-0.63	-2.21					
81895	1:47	5	-0.66	3.10	0.38	-4.60	-0.38	0.08					
2 hour differences													
81895	1:47	5	-1.29	9.50	-1.31	-60.30	-1.01	-2.13					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	1.92	-2.02	0.01	1.10
81795	23:47	30	1.28	-8.40	-0.16	-7.90	-0.60	-0.04	humidity	7.50	-11.30	-0.47	6.01
81795	23:57	30	-0.32	4.70	-1.47	-7.00	-0.52	-1.43	wind	1.16	-1.47	-0.25	0.77
81895	0:07	30	-0.27	1.70	-1.19	-11.00	-0.30	-1.21	direction	13.30	-14.40	-3.36	9.80
81895	0:17	30	-0.31	1.20	-0.52	13.30	0.32	-0.50	u	0.32	-0.60	-0.16	0.34
81895	0:27	30	1.92	-11.30	1.16	7.10	0.32	1.13	v	1.13	-1.43	-0.26	0.77
81895	0:37	30	-0.01	-0.30	0.05	-12.40	-0.46	0.08					
81895	0:47	30											
81895	0:57	30											
81895	1:07	30	-2.02	7.50	-0.11	-3.80	-0.03	-0.14					
81895	1:17	30											
81895	1:27	30											
81895	1:37	30	-0.05	2.60	-0.13	-14.40	-0.18	-0.43					
81895	1:47	30	-0.12	-1.90	0.13	5.90	-0.01	0.23					
1 hour differences													
81895	0:47	30											
81895	1:47	30											
2 hour differences													
81895	1:47	30	1.20	-4.20	-2.30	-60.00	-2.02	-2.98					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	2.05	-0.69	0.23	0.87
81795	23:47	42	1.72	-10.90	-0.59	-7.90	-0.77	-0.36	humidity	7.10	-10.90	-0.72	5.30
81795	23:57	42	-0.51	7.10	-0.31	-1.80	-0.20	-0.27	wind	0.41	-1.38	-0.23	0.51
81895	0:07	42	-0.39	2.90	-1.38	-11.00	-0.78	-1.28	direction	8.00	-19.40	-5.97	7.96
81895	0:17	42	-0.69	3.40	-0.61	-1.80	-0.08	-0.61	u	0.07	-0.78	-0.31	0.29
81895	0:27	42	2.05	-9.60	0.39	1.80	0.07	0.39	v	0.47	-1.28	-0.26	0.49
81895	0:37	42	0.19	-1.10	0.05	-10.70	-0.42	0.02					
81895	0:47	42	0.18	-0.40	-0.38	-19.40	-0.56	-0.57					
81895	0:57	42	0.10	-1.20	-0.08	-14.80	-0.34	-0.35					
81895	1:07	42											
81895	1:17	42											
81895	1:27	42	-0.06	-0.10	0.41	8.00	-0.16	0.47					
81895	1:37	42	0.00	1.60	-0.05	-7.70	-0.14	-0.27					
81895	1:47	42	-0.02	0.40	0.07	-0.40	-0.06	0.02					
1 hour differences													
81895	0:47	42	0.83	2.30	-2.24	-42.90	-1.97	-2.32					
81895	1:47	42	-0.19	2.80	0.37	-30.50	-1.04	-0.50					
2 hour differences													
81895	1:47	42	0.64	5.10	-1.87	-73.40	-3.01	-2.82					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81895	23:45	5	0.05	1.20	-0.60	-12.90	-0.05	-0.75	temp	0.18	-0.37	-0.17	0.17
81895	23:55	5	-0.17	0.20	-0.23	-9.60	-0.03	-0.35	humidity	2.80	-1.40	0.75	1.07
81995	0:05	5	-0.13	0.70	0.54	7.40	-0.23	0.54	wind	0.54	-0.66	-0.11	0.34
81995	0:15	5	-0.37	1.10	-0.05	-9.20	-0.18	-0.27	direction	14.80	-23.60	-4.38	10.69
81995	0:25	5	-0.31	2.80	-0.34	9.20	0.44	-0.02	u	0.44	-0.25	0.01	0.20
81995	0:35	5	-0.23	0.00	0.30	-2.00	-0.25	0.18	v	0.54	-0.75	-0.15	0.41
81995	0:45	5	-0.34	1.20	-0.05	-2.10	-0.01	-0.09					
81995	0:55	5	-0.28	1.60	-0.19	-14.30	-0.12	-0.47					
81995	1:05	5	-0.27	0.80	0.19	14.80	0.13	0.48					
81995	1:15	5	0.18	-1.40	0.14	0.80	-0.08	0.12					
81995	1:25	5	-0.29	1.80	-0.66	-11.50	0.29	-0.68					
81995	1:35	5	-0.12	-0.10	-0.14	-4.00	0.07	-0.15					
81995	1:45	5	0.03	-0.20	-0.28	-23.60	0.13	-0.51					
1 hour differences													
81995	0:45	5	-1.55	6.00	0.17	-6.30	-0.26	-0.01					
81995	1:45	5	-0.75	2.50	-0.94	-37.80	0.42	-1.21					
2 hour differences													
81995	1:45	5	-2.30	8.50	-0.77	-44.10	0.16	-1.22					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81895	23:45	30	-0.04	1.10	-1.09	-14.30	0.33	-1.20	temp	0.10	-0.25	-0.08	0.11
81895	23:55	30	-0.21	1.10	0.01	-10.90	-0.20	-0.32	humidity	1.70	-1.00	0.28	0.79
81995	0:05	30	-0.14	-0.10	1.00	9.50	-0.65	0.87	wind	1.00	-1.09	-0.09	0.53
81995	0:15	30	-0.25	0.70	-0.40	-4.10	0.23	-0.39	direction	9.50	-22.00	-4.83	8.96
81995	0:25	30	0.01	-0.90	0.11	2.30	-0.04	0.15	u	0.67	-0.65	0.00	0.40
81995	0:35	30	0.10	-1.00	0.18	-8.10	-0.35	-0.25	v	0.87	-1.20	-0.21	0.53
81995	0:45	30	-0.19	0.70	0.50	-4.20	-0.55	-0.01					
81995	0:55	30	0.01	0.00	0.35	-2.60	-0.39	-0.03					
81995	1:05	30	-0.01	0.10	-0.31	2.10	0.34	0.02					
81995	1:15	30	-0.03	0.30	-0.53	8.20	0.67	0.18					
81995	1:25	30	-0.06	0.40	-0.41	-22.00	0.06	-1.10					
81995	1:35	30	-0.21	1.70	-0.37	-7.10	0.35	-0.31					
81995	1:45	30	0.03	-0.40	-0.22	-11.60	0.26	-0.38					
1 hour differences													
81995	0:45	30	-0.68	0.50	1.40	-15.50	-1.56	0.05					
81995	1:45	30	-0.27	2.10	-1.49	-33.00	1.29	-1.62					
2 hour differences													
81995	1:45	30	-0.95	2.60	-0.09	-48.50	-0.27	-1.57					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
81895	23:45	42	-0.11	1.10	-1.03	-12.40	0.36	-1.13	temp	0.15	-0.24	-0.07	0.12
81895	23:55	42	-0.12	0.90	-0.15	-6.70	-0.01	-0.30	humidity	1.40	-1.50	0.27	0.85
81995	0:05	42	-0.10	-0.70	1.44	6.10	-1.06	1.01	wind	1.44	-1.03	-0.08	0.65
81995	0:15	42	-0.23	1.10	-0.68	-4.80	0.43	-0.59	direction	6.80	-19.50	-4.39	7.35
81995	0:25	42	0.09	-1.50	0.22	1.50	-0.15	0.18	u	0.56	-1.06	0.00	0.49
81995	0:35	42	0.04	-0.60	0.17	-5.70	-0.30	-0.20	v	1.01	-1.19	-0.22	0.57
81995	0:45	42	-0.15	0.50	0.62	-3.70	-0.66	0.04					
81995	0:55	42	0.15	-0.40	0.33	-4.00	-0.41	-0.15					
81995	1:05	42	-0.09	0.50	-0.42	2.30	0.45	0.01					
81995	1:15	42	-0.12	0.40	-0.43	6.80	0.56	0.22					
81995	1:25	42	0.00	0.70	-0.70	-19.50	0.35	-1.19					
81995	1:35	42	-0.24	1.40	-0.27	-8.40	0.25	-0.39					
81995	1:45	42	0.01	0.10	-0.19	-8.60	0.22	-0.33					
1 hour differences													
81995	0:45	42	-0.47	-0.30	1.62	-13.30	-1.75	0.14					
81995	1:45	42	-0.29	2.70	-1.68	-31.40	1.42	-1.83					
2 hour differences													
81995	1:45	42	-0.76	2.40	-0.06	-44.70	-0.33	-1.69					

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date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences													
81995	23:44	5	-0.29	2.40	-0.11	-7.70	-0.21	-0.01	temp	0.52	-1.52	-0.22	0.62
81995	23:54	5	0.24	-3.60	0.10	5.40	0.16	0.03	humidity	12.60	-4.90	-0.28	4.28
82095	0:04	5	0.15	-0.50	-0.63	-122.60	-1.45	-1.14	wind	1.97	-1.20	0.06	0.87
82095	0:14	5	-0.09	-1.20	-0.17	103.80	0.85	0.53	direction	103.80	-179.80	-6.58	74.45
82095	0:24	5	0.52	-4.90	1.97	-179.80	-0.74	-2.97	u	0.88	-1.45	-0.19	0.72
82095	0:34	5	0.49	-1.50	0.89	-0.10	-0.21	-0.87	v	2.71	-2.97	0.02	1.44
82095	0:44	5	0.06	-0.10	1.10	13.00	-1.22	-0.71					
82095	0:54	5	-1.36	-3.50	-1.20	13.40	-0.10	1.50					
82095	1:04	5	-0.22	-0.60	0.07	-11.10	0.49	-0.43					
82095	1:14	5	-0.53	-0.60	-0.97	15.60	-0.05	1.24					
82095	1:24	5	-0.36	-1.00	0.25	-26.80	0.88	-0.82					
82095	1:34	5	0.06	-1.10	-0.57	31.10	-0.76	1.16					
82095	1:44	5	-1.52	12.60	0.02	80.30	-0.05	2.71					
1 hour differences													
82095	0:44	5	1.37	-11.80	3.26	-125.90	-2.61	-5.13					
82095	1:44	5	-3.93	5.80	-2.40	102.50	0.41	5.36					
2 hour differences													
82095	1:44	5	-2.56	-6.00	0.86	-77.80	-2.20	0.23					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences													
81995	23:44	30	0.02	-0.10	0.49	20.70	0.57	-0.56	temp	1.02	-1.60	-0.22	0.58
81995	23:54	30	0.03	1.70	-0.66	2.90	-0.66	-0.05	humidity	6.50	-5.00	0.34	3.09
82095	0:04	30	-0.51	6.50	-1.22	-55.30	-1.27	0.22	wind	2.52	-1.59	0.15	1.14
82095	0:14	30	-0.16	1.60	1.20	58.40	1.24	-0.29	direction	58.40	-74.50	3.67	38.06
82095	0:24	30	1.02	-5.00	2.52	-74.50	-1.85	-3.64	u	1.24	-1.85	-0.37	1.09
82095	0:34	30	0.16	-0.10	1.31	0.00	-0.18	-1.30	v	2.66	-3.64	0.02	1.66
82095	0:44	30	-0.15	1.10	0.93	16.80	-1.84	-0.43					
82095	0:54	30	-1.60	-2.70	-1.59	25.50	-0.92	2.66					
82095	1:04	30	-0.20	-0.90	-0.27	-17.90	1.20	-0.70					
82095	1:14	30	-0.47	-0.90	-0.75	11.40	-0.15	1.06					
82095	1:24	30	-0.02	-2.20	-0.04	-19.30	0.99	-0.61					
82095	1:34	30	-0.37	0.10	-0.36	28.90	-1.05	1.29					
82095	1:44	30	-0.59	5.30	0.35	50.10	-0.88	2.64					
1 hour differences													
82095	0:44	30	0.39	5.80	4.08	-63.70	-4.56	-5.49					
82095	1:44	30	-3.25	-1.30	-2.66	78.70	-0.81	6.34					
2 hour differences													
82095	1:44	30	-2.86	4.50	1.42	-168.40	-5.37	0.85					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences													
81995	23:44	42	-0.02	2.00	0.46	13.20	0.44	-0.48	temp	0.95	-1.56	-0.23	0.55
81995	23:54	42	0.02	-0.50	-0.43	1.10	-0.43	0.03	humidity	6.30	-4.10	0.48	3.03
82095	0:04	42	-0.54	6.30	-1.07	-20.40	-1.05	0.45	wind	2.66	-1.08	0.14	1.09
82095	0:14	42	-0.15	3.50	0.86	19.80	0.85	-0.40	direction	49.40	-75.70	2.71	30.24
82095	0:24	42	0.95	-4.10	2.66	-75.70	-1.98	-4.00	u	1.57	-1.98	-0.41	1.08
82095	0:34	42	0.04	0.40	1.35	8.30	-0.92	-1.22	v	2.87	-4.00	0.05	1.69
82095	0:44	42	-0.14	1.00	0.84	15.70	-1.85	-0.17					
82095	0:54	42	-1.56	-2.90	-1.08	22.60	-1.08	2.31					
82095	1:04	42	-0.22	-0.70	-1.02	-14.20	1.57	-0.13					
82095	1:14	42	-0.43	-1.10	-0.37	9.00	-0.24	0.72					
82095	1:24	42	-0.05	-2.20	-0.07	-16.60	0.94	-0.66					
82095	1:34	42	-0.36	-0.30	-0.47	23.00	-0.80	1.32					
82095	1:44	42	-0.51	4.90	0.21	49.40	-0.83	2.87					
1 hour differences													
82095	0:44	42	0.18	6.60	4.21	-52.20	-5.38	-5.31					
82095	1:44	42	-3.13	-2.30	-2.80	73.20	-0.44	6.43					
2 hour differences													
82095	1:44	42	-2.95	4.30	1.41	-176.40	-5.82	1.12					

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date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82095	23:43	5	-0.24	1.10	-0.25	4.10	-0.26	0.31	temp	-0.05	-0.27	-0.17	0.08
82095	23:53	5	-0.06	-1.30	1.94	9.90	-1.52	-1.51	humidity	3.00	-1.80	0.78	1.22
82195	0:03	5	-0.27	3.00	-2.84	-7.40	1.60	2.42	wind	2.29	-2.84	-0.04	1.27
82195	0:13	5	-0.08	0.80	2.29	6.90	-1.32	-1.94	direction	18.30	-10.50	1.88	9.18
82195	0:23	5	-0.15	-1.80	-0.42	-4.40	0.55	0.23	u	1.60	-1.52	-0.12	1.04
82195	0:33	5	-0.26	1.60	0.48	-1.40	-0.03	-0.50	v	2.42	-1.94	0.09	1.08
82195	0:43	5	-0.20	1.10	0.25	1.00	-0.18	-0.20					
82195	0:53	5	-0.17	1.20	-0.73	0.20	0.23	0.69					
82195	1:03	5	-0.19	1.30	-0.06	1.90	-0.15	0.12					
82195	1:13	5	-0.05	0.50	-0.15	16.20	-1.20	0.85					
82195	1:23	5	-0.10	0.30	-0.34	-10.30	0.93	-0.19					
82195	1:33	5	-0.21	1.40	0.29	18.30	-1.43	0.70					
82195	1:43	5	-0.22	0.90	-0.99	-10.50	1.27	0.21					
1 hour differences													
82195	0:43	5	-1.02	3.40	1.70	4.60	-0.90	-1.50					
82195	1:43	5	-0.94	5.60	-1.98	15.80	-0.35	2.38					
2 hour differences													
82195	1:43	5	-1.96	9.00	-0.28	20.40	-1.25	0.88					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82095	23:43	30	-0.19	0.90	-2.03	10.80	2.00	1.82	temp	-0.11	-0.22	-0.16	0.04
82095	23:53	30	-0.14	-0.90	2.20	11.60	-2.13	-1.96	humidity	2.40	-2.00	0.76	1.12
82195	0:03	30	-0.13	2.40	-1.92	-1.80	0.67	1.81	wind	2.40	-2.03	-0.08	1.39
82195	0:13	30	-0.18	1.30	2.40	7.10	-1.43	-2.06	direction	18.70	-7.70	3.62	7.73
82195	0:23	30	-0.11	-2.00	0.75	-5.40	0.44	-0.94	u	2.00	-2.13	-0.14	1.28
82195	0:33	30	-0.22	1.60	0.23	-0.50	0.01	-0.24	v	1.82	-2.06	0.16	1.26
82195	0:43	30	-0.18	1.10	-0.33	0.90	-0.04	0.35					
82195	0:53	30	-0.14	1.00	-0.96	2.50	-0.01	1.01					
82195	1:03	30	-0.16	1.10	-0.04	2.90	-0.32	0.16					
82195	1:13	30	-0.15	0.90	0.22	10.90	-1.27	0.40					
82195	1:23	30	-0.11	0.40	-0.11	-7.70	0.88	-0.35					
82195	1:33	30	-0.21	1.40	0.29	18.70	-2.06	1.04					
82195	1:43	30	-0.18	0.70	-1.73	-3.00	1.40	1.07					
1 hour differences													
82195	0:43	30	-0.96	3.50	3.33	11.90	-2.48	-3.04					
82195	1:43	30	-0.95	5.50	-2.33	24.30	-1.38	3.33					
2 hour differences													
82195	1:43	30	-1.91	9.00	1.00	36.20	-3.86	0.29					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82095	23:43	42	-0.16	0.90	-2.43	12.60	2.78	2.07	temp	-0.09	-0.24	-0.16	0.05
82095	23:53	42	-0.14	-0.90	3.27	7.90	-2.47	-3.05	humidity	2.30	-2.10	0.75	1.13
82195	0:03	42	-0.10	2.30	-2.44	3.80	0.30	2.46	wind	3.27	-2.44	-0.10	1.66
82195	0:13	42	-0.24	1.40	2.32	6.90	-1.58	-1.86	direction	18.20	-8.60	3.92	7.66
82195	0:23	42	-0.09	-2.10	0.66	-4.50	0.30	-0.85	u	2.78	-2.47	-0.13	1.47
82195	0:33	42	-0.21	1.60	0.49	-1.70	0.07	-0.54	v	2.46	-3.05	0.19	1.53
82195	0:43	42	-0.19	1.10	-0.58	0.40	0.14	0.56					
82195	0:53	42	-0.10	1.00	-0.78	4.30	-0.24	0.94					
82195	1:03	42	-0.18	1.10	-0.30	-0.10	0.13	0.27					
82195	1:13	42	-0.12	0.90	0.71	13.10	-1.81	0.24					
82195	1:23	42	-0.14	0.40	-0.46	-8.60	1.20	-0.22					
82195	1:33	42	-0.24	1.50	-0.05	18.20	-1.78	1.43					
82195	1:43	42	-0.17	0.60	-1.70	-1.30	1.32	1.08					
1 hour differences													
82195	0:43	42	-0.97	3.40	3.72	12.80	-3.24	-3.28					
82195	1:43	42	-0.95	5.50	-2.58	25.60	-1.18	3.74					
2 hour differences													
82195	1:43	42	-1.92	8.90	1.14	38.40	-4.42	0.46					

SUNSET 82195

date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82195	23:42	5	0.00	0.70	0.02	-1.10	0.05	-0.06	temp	0.19	-0.28	-0.07	0.12
82195	23:52	5	-0.05	0.70	-0.37	-11.40	0.86	-0.08	humidity	1.40	-0.60	0.45	0.53
82295	0:02	5	-0.17	0.80	-0.95	16.70	-0.29	1.31	wind	0.98	-0.95	-0.08	0.55
82295	0:12	5	-0.13	0.80	0.98	-2.20	-0.53	-0.83	direction	16.70	-11.40	-0.09	7.44
82295	0:22	5	-0.03	0.20	0.40	-4.50	0.01	-0.51	u	0.86	-0.59	0.05	0.43
82295	0:32	5	-0.02	0.30	-0.31	-7.40	0.60	0.00	v	1.31	-0.83	0.06	0.58
82295	0:42	5	-0.09	0.50	-0.44	6.70	-0.14	0.60					
82295	0:52	5	-0.08	0.40	0.62	4.20	-0.59	-0.35					
82295	1:02	5	0.00	-0.30	-0.34	-4.60	0.45	0.10					
82295	1:12	5	-0.06	0.00	-0.02	5.40	-0.27	0.22					
82295	1:22	5	0.19	-0.60	0.28	-7.10	0.23	-0.50					
82295	1:32	5	-0.23	0.90	-0.14	0.80	0.03	0.15					
82295	1:42	5	-0.28	1.40	-0.80	3.30	0.28	0.77					
1 hour differences													
82295	0:42	5	-0.49	3.30	-0.69	-2.10	0.51	0.49					
82295	1:42	5	-0.46	1.80	-0.40	2.00	0.13	0.39					
2 hour differences													
82295	1:42	5	-0.95	5.10	-1.09	-0.10	0.64	0.88					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82195	23:42	30	-0.05	0.90	-0.17	-9.70	0.94	-0.36	temp	0.14	-0.29	-0.05	0.11
82195	23:52	30	-0.01	0.50	-0.55	0.00	0.24	0.49	humidity	1.30	-0.60	0.38	0.52
82295	0:02	30	-0.02	0.60	-2.05	13.60	0.26	2.25	wind	1.82	-2.05	-0.10	0.92
82295	0:12	30	-0.13	0.70	1.82	0.20	-1.17	-1.39	direction	13.60	-9.70	0.15	6.02
82295	0:22	30	0.03	0.00	0.86	-5.90	-0.07	-1.03	u	0.94	-1.17	0.05	0.49
82295	0:32	30	-0.04	0.30	-0.37	-0.60	0.26	0.28	v	2.25	-1.39	0.08	0.93
82295	0:42	30	-0.06	0.50	-0.57	2.20	0.15	0.58					
82295	0:52	30	-0.05	0.30	0.37	0.90	-0.28	-0.25					
82295	1:02	30	0.06	-0.60	0.51	-2.30	-0.11	-0.54					
82295	1:12	30	-0.07	0.00	-0.61	8.30	-0.25	0.96					
82295	1:22	30	0.14	-0.30	0.07	-6.00	0.38	-0.40					
82295	1:32	30	-0.18	0.80	-0.60	-0.70	0.40	0.45					
82295	1:42	30	-0.29	1.30	0.05	2.00	-0.16	0.06					
1 hour differences													
82295	0:42	30	-0.23	2.60	-0.86	9.50	-0.33	1.18					
82295	1:42	30	-0.39	1.50	-0.21	2.20	-0.02	0.28					
2 hour differences													
82295	1:42	30	-0.62	4.10	-1.07	11.70	-0.35	1.46					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82195	23:42	42	-0.04	0.90	0.09	-7.10	0.60	-0.46	temp	0.13	-0.27	-0.05	0.10
82195	23:52	42	0.01	0.50	-1.01	4.80	0.09	1.11	humidity	1.30	-0.60	0.37	0.50
82295	0:02	42	-0.01	0.50	-1.43	4.10	0.54	1.36	wind	1.61	-1.43	-0.10	0.86
82295	0:12	42	-0.12	0.70	1.28	4.80	-1.08	-0.77	direction	4.80	-7.10	0.42	3.79
82295	0:22	42	0.02	0.00	1.61	-5.50	-0.56	-1.61	u	0.60	-1.08	0.03	0.49
82295	0:32	42	-0.03	0.30	-0.80	-0.30	0.49	0.63	v	1.36	-1.61	0.10	0.80
82295	0:42	42	-0.05	0.40	-0.41	0.70	0.18	0.38					
82295	0:52	42	-0.05	0.30	0.27	2.20	-0.33	-0.09					
82295	1:02	42	0.07	-0.60	-0.10	-0.10	0.07	0.07					
82295	1:12	42	-0.07	0.00	-0.06	3.30	-0.21	0.25					
82295	1:22	42	0.13	-0.20	0.20	-3.40	0.13	-0.37					
82295	1:32	42	-0.19	0.70	-0.88	0.20	0.53	0.71					
82295	1:42	42	-0.27	1.30	-0.01	1.80	-0.11	0.10					
1 hour differences													
82295	0:42	42	-0.18	2.40	-0.76	8.60	-0.34	1.10					
82295	1:42	42	-0.38	1.50	-0.58	4.00	0.08	0.67					
2 hour differences													
82295	1:42	42	-0.56	3.90	-1.34	12.60	-0.26	1.77					

SUNSET 82295

incomplete data

SUNSET 82395

date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	0.00	-0.52	-0.22	0.14
82395	23:39	5	-0.14	1.30	-0.34	-1.30	0.27	0.24	humidity	1.50	-0.40	0.84	0.50
82395	23:49	5	-0.24	0.70	-0.46	-0.90	0.29	0.36	wind	0.54	-1.18	-0.19	0.49
82395	23:59	5	-0.17	0.80	0.11	0.20	-0.07	-0.09	direction	16.40	-13.10	0.52	7.43
82495	0:09	5	-0.32	1.20	-0.52	5.90	-0.07	0.67	u	0.74	-0.77	0.08	0.38
82495	0:19	5	-0.22	1.00	-0.15	6.00	-0.21	0.36	v	0.92	-0.65	0.17	0.48
82495	0:29	5	-0.30	1.20	-1.18	1.30	0.74	0.92					
82495	0:39	5	-0.26	0.90	0.54	-7.70	-0.05	-0.65					
82495	0:49	5	-0.33	1.20	-0.25	3.70	0.00	0.31					
82495	0:59	5	0.00	0.30	0.39	-8.10	0.12	-0.56					
82495	1:09	5	-0.21	0.70	-0.78	3.20	0.29	0.74					
82495	1:19	5	-0.03	-0.40	0.34	16.40	-0.77	0.24					
82495	1:29	5	-0.12	0.50	-0.28	-13.10	0.62	-0.21					
82495	1:39	5	-0.52	1.50	0.17	1.10	-0.14	-0.10					
1 hour differences													
82495	0:39	5	-1.51	5.80	-1.66	4.80	0.63	1.57					
82495	1:39	5	-1.21	3.80	-0.41	3.20	0.12	0.42					
2 hour differences													
82495	1:39	5	-2.72	9.60	-2.07	8.00	0.75	1.99					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	-0.02	-0.52	-0.17	0.13
82395	23:39	30	-0.26	1.70	0.00	9.10	-0.80	0.50	humidity	1.70	-0.40	0.75	0.50
82395	23:49	30	-0.09	0.50	-0.04	-9.00	0.81	-0.45	wind	1.14	-1.42	-0.12	0.70
82395	23:59	30	-0.12	0.80	-0.56	4.40	-0.10	0.70	direction	11.10	-11.60	0.85	7.28
82495	0:09	30	-0.18	0.80	-0.31	4.10	-0.14	0.46	u	0.89	-0.80	0.00	0.59
82495	0:19	30	-0.14	0.90	0.40	6.10	-0.68	0.04	v	1.20	-1.01	0.14	0.72
82495	0:29	30	-0.22	1.10	-1.42	3.10	0.79	1.20					
82495	0:39	30	-0.19	0.60	0.35	-10.10	0.34	-0.74					
82495	0:49	30	-0.23	0.70	0.34	4.10	-0.46	-0.07					
82495	0:59	30	-0.02	0.60	-0.21	-11.60	0.89	-0.34					
82495	1:09	30	-0.22	0.80	-0.85	11.10	-0.20	1.14					
82495	1:19	30	-0.06	-0.40	0.52	-0.30	-0.31	-0.42					
82495	1:29	30	-0.02	0.30	-0.93	3.40	0.43	0.85					
82495	1:39	30	-0.52	1.30	1.14	-3.30	-0.56	-1.01					
1 hour differences													
82495	0:39	30	-0.94	4.70	-1.58	-1.40	1.02	1.21					
82495	1:39	30	-1.07	3.30	0.01	3.40	-0.21	0.15					
2 hour differences													
82495	1:39	30	-2.01	8.00	-1.57	2.00	0.81	1.36					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
(UTC)	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences									temp	-0.01	-0.50	-0.17	0.12
82395	23:39	42	-0.26	1.70	-0.23	6.80	-0.47	0.60	humidity	1.70	-0.20	0.72	0.45
82395	23:49	42	-0.08	0.50	0.12	-8.40	0.67	-0.58	wind	0.74	-1.09	-0.12	0.64
82395	23:59	42	-0.10	0.90	-0.93	6.10	-0.01	1.10	direction	7.50	-9.10	0.84	5.67
82495	0:09	42	-0.17	0.70	-0.18	2.20	-0.05	0.26	u	0.89	-0.64	0.01	0.50
82495	0:19	42	-0.13	0.80	0.44	5.10	-0.64	-0.05	v	1.10	-0.76	0.15	0.66
82495	0:29	42	-0.21	1.00	-1.03	1.50	0.61	0.84					
82495	0:39	42	-0.15	0.50	0.51	-7.10	0.11	-0.76					
82495	0:49	42	-0.21	0.70	0.38	1.70	-0.35	-0.20					
82495	0:59	42	-0.06	0.70	-0.40	-9.10	0.89	-0.12					
82495	1:09	42	-0.20	0.60	-0.53	7.50	-0.22	0.77					
82495	1:19	42	-0.09	-0.20	0.58	0.90	-0.41	-0.42					
82495	1:29	42	-0.01	0.30	-1.09	3.90	0.47	1.03					
82495	1:39	42	-0.50	1.20	0.74	-0.20	-0.48	-0.56					
1 hour differences													
82495	0:39	42	-0.84	4.40	-1.07	-0.60	0.69	0.81					
82495	1:39	42	-1.07	3.30	-0.32	4.70	-0.10	0.50					
2 hour differences													
82495	1:39	42	-1.91	7.70	-1.39	4.10	0.59	1.31					

SUNSET 82495

date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82495	23:38	5	-0.08	0.00	-0.37	-8.00	0.46	-0.15	temp	0.03	-0.26	-0.13	0.10
82495	23:48	5	-0.21	-0.20	0.37	5.30	-0.42	0.04	humidity	1.50	-0.70	0.66	0.74
82495	23:58	5	-0.05	-0.70	1.42	-2.60	-1.25	-0.69	wind	1.42	-1.10	-0.04	0.66
82595	0:08	5	-0.09	0.80	-0.93	-0.50	0.86	0.36	direction	10.10	-8.70	-0.82	5.69
82595	0:18	5	-0.22	1.50	-0.36	-3.40	0.39	0.01	u	0.89	-1.25	0.05	0.60
82595	0:28	5	-0.18	1.40	-0.18	-8.70	0.36	-0.22	v	0.67	-0.69	-0.01	0.36
82595	0:38	5	-0.21	1.50	-0.31	10.10	0.05	0.50					
82595	0:48	5	-0.26	1.50	0.01	0.40	-0.02	0.01					
82595	0:58	5	0.03	0.20	0.01	-8.70	0.16	-0.28					
82595	1:08	5	0.00	0.20	0.79	4.20	-0.76	-0.28					
82595	1:18	5	-0.25	1.30	-1.10	3.60	0.89	0.67					
82595	1:28	5	-0.09	0.60	0.03	-1.30	-0.01	-0.05					
82595	1:38	5	-0.07	0.50	0.16	-1.10	-0.12	-0.11					
1 hour differences													
82595	0:38	5	-0.96	4.30	0.01	0.20	-0.01	0.00					
82595	1:38	5	-0.64	4.30	-0.10	-2.90	0.14	-0.04					
2 hour differences													
82595	1:38	5	-1.60	8.60	-0.09	-2.70	0.13	-0.04					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82495	23:38	30	-0.07	0.50	-1.17	-7.50	1.25	0.02	temp	0.02	-0.26	-0.10	0.08
82495	23:48	30	-0.09	-0.60	0.57	2.50	-0.57	-0.11	humidity	1.60	-0.60	0.61	0.63
82495	23:58	30	-0.01	-0.40	1.34	-2.10	-1.16	-0.69	wind	1.34	-1.17	-0.08	0.67
82595	0:08	30	-0.11	0.90	-0.92	5.90	0.68	0.76	direction	6.90	-12.80	-0.94	6.14
82595	0:18	30	-0.14	1.00	-0.15	-12.80	0.50	-0.69	u	1.25	-1.16	0.10	0.65
82595	0:28	30	-0.17	1.60	-0.48	-0.50	0.42	0.23	v	0.76	-0.69	-0.02	0.41
82595	0:38	30	-0.05	0.80	-0.11	6.50	-0.08	0.37					
82595	0:48	30	-0.20	1.10	0.14	-0.10	-0.12	-0.07					
82595	0:58	30	0.02	0.40	-0.04	-8.90	0.29	-0.41					
82595	1:08	30	0.01	0.10	0.48	6.90	-0.63	0.10					
82595	1:18	30	-0.26	1.20	-0.75	-3.30	0.75	0.21					
82595	1:28	30	-0.15	0.90	-0.04	3.60	-0.06	0.18					
82595	1:38	30	-0.06	0.40	0.07	-2.40	0.00	-0.14					
1 hour differences													
82595	0:38	30	-0.57	3.30	0.25	-0.50	-0.21	-0.13					
82595	1:38	30	-0.64	4.10	-0.14	-4.20	0.23	-0.13					
2 hour differences													
82595	1:38	30	-1.21	7.40	0.11	-4.70	0.02	-0.26					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82495	23:38	42	-0.06	0.50	-0.77	-10.00	0.95	-0.32	temp	0.08	-0.31	-0.09	0.10
82495	23:48	42	-0.09	-0.50	0.19	4.30	-0.28	0.15	humidity	1.40	-0.50	0.61	0.62
82495	23:58	42	0.03	-0.50	1.54	1.60	-1.48	-0.44	wind	1.54	-1.21	-0.07	0.62
82595	0:08	42	-0.14	1.00	-1.21	3.10	1.07	0.61	direction	5.90	-15.60	-0.83	6.72
82595	0:18	42	-0.12	1.10	-0.12	-15.60	0.54	-0.87	u	1.07	-1.48	0.09	0.63
82595	0:28	42	-0.15	1.40	-0.31	3.30	0.16	0.34	v	0.61	-0.87	-0.02	0.42
82595	0:38	42	-0.07	0.90	-0.15	5.90	-0.02	0.37					
82595	0:48	42	-0.15	1.00	0.07	-0.70	-0.05	-0.07					
82595	0:58	42	-0.01	0.30	0.11	-5.00	0.04	-0.31					
82595	1:08	42	0.08	0.10	0.15	4.90	-0.27	0.20					
82595	1:18	42	-0.31	1.30	-0.18	-7.20	0.36	-0.30					
82595	1:28	42	-0.16	0.80	-0.25	5.40	0.07	0.39					
82595	1:38	42	-0.08	0.50	-0.04	-0.80	0.06	-0.02					
1 hour differences													
82595	0:38	42	-0.54	3.40	-0.06	2.60	-0.01	0.16					
82595	1:38	42	-0.63	4.00	-0.14	-3.40	0.21	-0.11					
2 hour differences													
82595	1:38	42	-1.17	7.40	-0.20	-0.80	0.20	0.05					

SUNSET 82595

date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.03	-0.54	-0.17	0.18
82595	23:37	5	-0.31	0.90	0.24	11.20	-0.75	0.38	humidity	3.10	-0.60	0.77	0.99
82595	23:47	5	-0.54	3.10	-0.87	22.90	-0.02	1.74	wind	0.83	-1.34	-0.09	0.72
82595	23:57	5	-0.31	1.70	-0.07	3.60	0.01	0.22	direction	22.90	-25.00	0.36	12.31
82695	0:07	5	-0.03	0.40	-0.76	-25.00	1.24	-0.79	u	1.24	-0.77	0.04	0.67
82695	0:17	5	-0.22	0.80	0.83	3.80	-0.77	-0.35	v	1.74	-0.79	0.08	0.73
82695	0:27	5	-0.36	1.90	-1.34	12.40	0.86	1.17					
82695	0:37	5	-0.07	-0.60	0.20	-8.30	-0.03	-0.37					
82695	0:47	5	-0.01	-0.20	0.06	-4.50	0.05	-0.18					
82695	0:57	5	0.02	-0.10	0.82	2.50	-0.74	-0.38					
82695	1:07	5	0.03	0.50	-1.11	-11.50	1.18	0.31					
82695	1:17	5	0.00	0.10	0.59	-7.90	-0.14	-0.65					
82695	1:27	5	-0.30	0.90	0.42	-2.70	-0.13	-0.42					
82695	1:37	5	-0.15	0.60	-0.18	8.20	-0.22	0.40					
1 hour differences													
82695	0:37	5	-1.53	7.30	-2.01	9.40	1.29	1.62					
82695	1:37	5	-0.41	1.80	0.60	-15.90	0.00	-0.92					
2 hour differences													
82695	1:37	5	-1.94	9.10	-1.41	-6.50	1.29	0.70					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.06	-0.36	-0.13	0.11
82595	23:37	30	-0.15	0.60	0.06	13.70	-0.90	0.89	humidity	2.50	-1.00	0.66	0.83
82595	23:47	30	-0.36	2.50	0.05	13.00	-0.64	1.02	wind	1.02	-1.92	-0.06	0.83
82595	23:57	30	-0.23	1.70	-0.58	2.20	0.47	0.40	direction	13.70	-17.90	0.16	9.21
82695	0:07	30	-0.03	0.30	-0.97	-17.90	1.49	-0.69	u	1.51	-0.90	0.03	0.87
82695	0:17	30	-0.16	0.30	0.64	6.30	-0.78	0.00	v	1.22	-0.70	0.05	0.66
82695	0:27	30	-0.19	1.10	-1.92	5.00	1.51	1.22					
82695	0:37	30	0.01	-1.00	1.02	-4.30	-0.77	-0.70					
82695	0:47	30	-0.07	0.50	-0.42	-10.30	0.69	-0.23					
82695	0:57	30	0.06	0.10	0.44	2.50	-0.43	-0.18					
82695	1:07	30	-0.11	0.80	0.03	-11.20	0.48	-0.51					
82695	1:17	30	-0.11	0.50	0.65	1.70	-0.51	-0.42					
82695	1:27	30	-0.26	0.90	-0.60	-1.80	0.48	0.38					
82695	1:37	30	-0.09	0.30	0.81	3.20	-0.70	-0.47					
1 hour differences													
82695	0:37	30	-0.96	4.90	-1.76	4.30	1.28	1.25					
82695	1:37	30	-0.58	3.10	0.91	-15.90	0.01	-1.43					
2 hour differences													
82695	1:37	30	-1.54	8.00	-0.85	-11.60	1.29	-0.18					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.11	-0.36	-0.12	0.12
82595	23:37	42	-0.14	0.50	0.17	10.30	-0.75	0.60	humidity	2.50	-1.20	0.64	0.87
82595	23:47	42	-0.36	2.50	-0.20	10.60	-0.32	0.94	wind	1.41	-1.70	-0.03	0.81
82595	23:57	42	-0.20	1.70	-0.65	-0.10	0.59	0.27	direction	10.60	-13.50	-0.12	7.63
82695	0:07	42	-0.04	0.30	-0.30	-13.50	0.80	-0.71	u	1.34	-1.08	0.03	0.75
82695	0:17	42	-0.13	0.10	0.24	7.30	-0.51	0.31	v	1.08	-0.96	0.01	0.67
82695	0:27	42	-0.19	1.10	-1.70	4.60	1.34	1.08					
82695	0:37	42	0.05	-1.20	1.41	-5.10	-1.08	-0.96					
82695	0:47	42	-0.09	0.70	-0.65	-11.50	0.98	-0.21					
82695	0:57	42	0.11	0.10	0.26	3.50	-0.34	-0.01					
82695	1:07	42	-0.17	0.80	0.07	-7.20	0.28	-0.39					
82695	1:17	42	-0.15	0.60	0.61	-1.00	-0.36	-0.50					
82695	1:27	42	-0.22	0.80	-0.67	0.80	0.41	0.54					
82695	1:37	42	-0.08	0.30	1.04	-0.20	-0.69	-0.78					
1 hour differences													
82695	0:37	42	-0.87	4.50	-1.20	3.80	0.82	0.93					
82695	1:37	42	-0.60	3.30	0.66	-15.60	0.28	-1.35					
2 hour differences													
82695	1:37	42	-1.47	7.80	-0.54	-11.80	1.10	-0.42					

SUNSET 82695

no data available

SUNSET 82795

date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.14	-0.21	-0.11	0.09
82795	23:34	5	-0.18	1.50	-1.55	-0.70	0.83	1.30	humidity	1.50	0.00	0.65	0.39
82795	23:44	5	-0.14	0.30	0.13	-2.80	0.08	-0.19	wind	0.47	-1.55	-0.17	0.57
82795	23:54	5	-0.02	0.90	0.07	3.50	-0.22	0.04	direction	21.70	-26.20	-1.68	11.79
82895	0:04	5	-0.09	0.30	0.27	5.20	-0.42	-0.04	u	1.06	-0.88	0.16	0.55
82895	0:14	5	-0.12	0.60	-0.09	-4.00	0.27	-0.07	v	1.30	-0.44	0.12	0.51
82895	0:24	5	-0.17	1.10	-1.16	4.30	0.46	1.08					
82895	0:34	5	-0.11	0.60	-0.14	-13.20	0.55	-0.15					
82895	0:44	5	-0.08	0.60	0.05	9.50	-0.37	0.14					
82895	0:54	5	-0.04	0.30	-0.08	-11.70	0.46	-0.15					
82895	1:04	5	-0.21	0.70	0.22	21.70	-0.88	0.30					
82895	1:14	5	0.14	0.00	-0.25	-26.20	1.06	-0.33					
82895	1:24	5	-0.18	0.60	0.47	0.60	-0.16	-0.44					
82895	1:34	5	-0.17	0.90	-0.17	-8.00	0.40	0.08					
1 hour differences													
82895	0:34	5	-0.65	3.80	-0.92	-7.00	0.72	0.67					
82895	1:34	5	-0.54	3.10	0.24	-14.10	0.51	-0.40					
2 hour differences													
82895	1:34	5	-1.19	6.90	-0.68	-21.10	1.23	0.27					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.04	-0.13	-0.05	0.05
82795	23:34	30	-0.10	1.30	-1.99	-1.30	1.06	1.69	humidity	1.30	-0.10	0.47	0.42
82795	23:44	30	-0.13	0.50	1.10	-10.60	0.43	-1.37	wind	1.10	-1.99	-0.24	0.91
82795	23:54	30	-0.05	0.90	-1.03	4.10	0.00	1.09	direction	8.90	-19.60	-1.94	8.01
82895	0:04	30	0.00	-0.10	0.81	8.90	-1.04	-0.39	u	1.45	-1.04	0.22	0.63
82895	0:14	30	-0.11	1.00	-1.30	4.60	0.38	1.29	v	1.69	-1.37	0.18	0.84
82895	0:24	30	-0.09	0.60	-0.51	-3.30	0.46	0.31					
82895	0:34	30	-0.06	0.30	0.14	-9.00	0.44	-0.38					
82895	0:44	30	-0.08	0.60	-0.10	7.80	-0.40	0.31					
82895	0:54	30	-0.01	0.10	0.02	-4.50	0.24	-0.15					
82895	1:04	30	0.00	0.30	0.37	3.50	-0.37	-0.22					
82895	1:14	30	0.04	0.10	-1.13	-19.60	1.45	0.67					
82895	1:24	30	-0.01	0.00	0.57	-2.10	0.03	-0.58					
82895	1:34	30	-0.06	0.50	-0.03	-3.70	0.22	0.01					
1 hour differences													
82895	0:34	30	-0.44	3.20	-0.79	-5.30	0.67	0.55					
82895	1:34	30	-0.12	1.60	-0.30	-18.60	1.17	0.04					
2 hour differences													
82895	1:34	30	-0.56	4.80	-1.09	-23.90	1.84	0.59					
date	time (UTC)	height (meters)	temp (C)	humidity (%)	wind speed (m/s)	direction (deg. true)	u (m/s)	v (m/s)		max	min	mean	st dev
10 minute differences									temp	0.06	-0.16	-0.05	0.06
82795	23:34	42	-0.04	1.20	-1.76	-2.60	1.11	1.39	humidity	1.20	0.00	0.45	0.38
82795	23:44	42	-0.16	0.50	1.23	-11.10	0.45	-1.53	wind	1.23	-1.76	-0.26	0.81
82795	23:54	42	-0.05	0.90	-0.87	7.20	-0.32	1.06	direction	7.60	-23.10	-2.24	9.01
82895	0:04	42	0.01	0.00	0.38	5.70	-0.63	-0.09	u	1.64	-0.63	0.25	0.64
82895	0:14	42	-0.11	0.90	-1.16	4.10	0.33	1.16	v	1.39	-1.53	0.19	0.79
82895	0:24	42	-0.08	0.60	-0.54	-0.50	0.34	0.43					
82895	0:34	42	-0.06	0.30	0.06	-9.90	0.53	-0.37					
82895	0:44	42	-0.07	0.60	-0.13	7.60	-0.37	0.34					
82895	0:54	42	0.02	0.00	0.43	-2.90	-0.05	-0.46					
82895	1:04	42	0.00	0.30	-0.04	1.00	-0.04	0.07					
82895	1:14	42	0.06	0.00	-0.95	-23.10	1.64	0.42					
82895	1:24	42	-0.07	0.30	0.46	4.70	-0.34	-0.41					
82895	1:34	42	-0.05	0.30	-0.53	-9.30	0.59	0.46					
1 hour differences													
82895	0:34	42	-0.45	3.20	-0.90	-4.50	0.70	0.66					
82895	1:34	42	-0.11	1.50	-0.76	-22.00	1.43	0.42					
2 hour differences													
82895	1:34	42	-0.56	4.70	-1.66	-26.50	2.13	1.08					

SUNSET 82895

date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82895	23:33	5	-0.06	0.10	-1.74	-0.10	1.07	1.38	temp	0.02	-0.31	-0.16	0.09
82895	23:43	5	-0.18	1.40	0.91	-7.60	-0.04	-1.07	humidity	1.40	-0.20	0.69	0.47
82895	23:53	5	-0.14	0.70	-0.08	-0.40	0.07	0.06	wind	0.91	-1.74	-0.22	0.68
82995	0:03	5	-0.25	0.60	-0.55	5.30	-0.05	0.67	direction	9.20	-11.60	-0.22	6.42
82995	0:13	5	-0.19	1.10	-0.73	9.20	0.01	0.94	u	1.07	-0.75	0.14	0.43
82995	0:23	5	-0.26	0.90	-0.17	-5.30	0.34	-0.07	v	1.38	-1.07	0.17	0.65
82995	0:33	5	-0.11	0.30	0.38	-7.00	0.11	-0.55					
82995	0:43	5	-0.24	1.00	-0.13	6.60	-0.25	0.34					
82995	0:53	5	-0.11	0.70	-0.55	-1.60	0.40	0.38					
82995	1:03	5	-0.07	0.30	-0.08	-1.30	0.10	0.03					
82995	1:13	5	-0.20	0.80	-0.61	3.90	0.24	0.59					
82995	1:23	5	0.02	-0.20	0.76	7.10	-0.75	-0.35					
82995	1:33	5	-0.31	1.30	-0.32	-11.60	0.63	-0.12					
1 hour differences													
82995	0:33	5	-1.13	5.00	-0.24	-5.80	0.44	-0.02					
82995	1:33	5	-0.91	3.90	-0.93	3.10	0.37	0.87					
2 hour differences													
82995	1:33	5	-2.04	8.90	-1.17	-2.70	0.81	0.85					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82895	23:33	30	0.00	0.00	-1.87	3.70	0.91	1.68	temp	0.01	-0.27	-0.12	0.08
82895	23:43	30	-0.15	1.40	0.74	-12.10	0.50	-1.28	humidity	1.40	0.00	0.58	0.43
82895	23:53	30	-0.09	0.80	-0.86	3.70	0.16	0.91	wind	0.77	-1.87	-0.26	0.83
82995	0:03	30	-0.16	0.20	0.49	-2.50	-0.07	-0.53	direction	10.50	-12.10	-0.24	5.92
82995	0:13	30	-0.13	1.10	-1.14	10.50	-0.05	1.45	u	0.91	-0.57	0.17	0.40
82995	0:23	30	-0.20	0.60	0.02	-7.70	0.45	-0.38	v	1.68	-1.28	0.19	0.88
82995	0:33	30	-0.10	0.30	0.73	-0.60	-0.36	-0.63					
82995	0:43	30	-0.16	0.70	-0.19	2.70	-0.09	0.29					
82995	0:53	30	-0.08	0.60	-0.67	-0.30	0.41	0.53					
82995	1:03	30	-0.11	0.40	-0.10	-0.30	0.08	0.07					
82995	1:13	30	-0.06	0.20	-1.01	4.70	0.38	0.98					
82995	1:23	30	0.01	0.10	0.77	1.40	-0.57	-0.53					
82995	1:33	30	-0.27	1.10	-0.28	-6.30	0.50	-0.04					
1 hour differences													
82995	0:33	30	-0.83	4.40	-0.02	-8.70	0.63	-0.46					
82995	1:33	30	-0.67	3.10	-1.48	1.90	0.71	1.30					
2 hour differences													
82995	1:33	30	-1.50	7.50	-1.50	-6.80	1.34	0.84					
date	time	height	temp	humidity	wind speed	direction	u	v		max	min	mean	st dev
	(UTC)	(meters)	(C)	(%)	(m/s)	(deg. true)	(m/s)	(m/s)					
10 minute differences													
82895	23:33	42	-0.01	-0.10	-1.75	5.50	0.71	1.70	temp	-0.01	-0.25	-0.11	0.07
82895	23:43	42	-0.13	1.50	0.93	-10.80	0.27	-1.41	humidity	1.50	-0.10	0.55	0.43
82895	23:53	42	-0.08	0.70	-1.19	1.70	0.53	1.08	wind	0.93	-1.75	-0.25	0.81
82995	0:03	42	-0.15	0.30	0.88	-4.20	-0.13	-0.96	direction	9.70	-10.80	0.04	5.15
82995	0:13	42	-0.16	1.00	-1.35	9.70	0.06	1.62	u	0.71	-0.40	0.15	0.29
82995	0:23	42	-0.14	0.50	0.15	-6.80	0.35	-0.46	v	1.70	-1.41	0.19	0.91
82995	0:33	42	-0.11	0.30	0.49	1.70	-0.40	-0.32					
82995	0:43	42	-0.13	0.70	-0.14	1.70	-0.04	0.21					
82995	0:53	42	-0.09	0.50	-0.47	1.30	0.20	0.44					
82995	1:03	42	-0.10	0.40	-0.13	-0.70	0.12	0.06					
82995	1:13	42	-0.01	0.10	-0.48	1.40	0.22	0.44					
82995	1:23	42	-0.03	0.30	-0.25	0.40	0.14	0.21					
82995	1:33	42	-0.25	1.00	0.10	-0.40	-0.04	-0.09					
1 hour differences													
82995	0:33	42	-0.77	4.30	-0.09	-8.70	0.68	-0.45					
82995	1:33	42	-0.61	3.00	-1.37	3.70	0.60	1.27					
2 hour differences													
82995	1:33	42	-1.38	7.30	-1.46	-5.00	1.28	0.82					

SUNSET 82995

no data available

Changes with height of meteorological variables at selected times at Memphis in 1995.

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Date	Time (UTC)	height (meters)	u (m/s)	v (m/s)	virt. temp (Deg. K)	speed (m/s)	direction (Degrees)	change from 10 meters				change from 30 meters							
								speed (m/s)	direction (Degrees)	u (m/s)	v (m/s)	virt. temp (Deg. K)	speed (m/s)	direction (Degrees)	u (m/s)	v (m/s)	virt. temp (Deg. K)		
08/10/95	23:50:00	10	1.34	-1.53	307.59	2.03	318.79												
08/10/95	23:50:00	30	1.64	-1.46	307.66	2.20	311.68	0.16	-7.11	0.30	0.07	0.07							
08/10/95	23:50:00	100	1.67	0.49	307.26	1.74	253.65	-0.29	-65.14	0.33	2.02	-0.33	-0.46	-58.03	0.03	1.95	-0.40		
08/10/95	23:50:00	300	0.27	1.42	307.08	1.45	190.77	-0.59	-128.02	-1.07	2.95	-0.51	-0.75	-120.91	-1.37	2.88	-0.58		
08/11/95	4:00:00	10	-1.23	0.32	303.38	1.27	104.58												
08/11/95	4:00:00	30	-2.24	0.35	303.75	2.27	98.88	1.00	-5.70	-1.01	0.03	0.37							
08/11/95	4:00:00	100	-1.73	0.68	304.71	1.86	111.46	0.59	6.88	-0.50	0.36	1.33	-0.41	12.58	0.51	0.33	0.96		
08/11/95	4:00:00	300	1.23	0.43	306.96	1.30	250.73	0.03	146.15	2.46	0.11	3.58	-0.96	151.85	3.47	0.08	3.21		
08/15/95	4:00:00	10	-0.70	3.75	304.41	3.81	169.43												
08/15/95	4:00:00	30	-0.97	4.83	304.96	4.93	168.64	1.11	-0.78	-0.27	1.08	0.55							
08/15/95	4:00:00	100	0.36	6.23	306.52	6.24	183.31	2.43	13.88	1.06	2.48	2.11	1.31	14.66	1.33	1.40	1.56		
08/15/95	4:00:00	300	2.40	5.62	307.29	6.11	203.12	2.30	33.70	3.10	1.87	2.88	1.18	34.48	3.37	0.79	2.33		
08/16/95	4:00:00	10	-0.40	1.37	304.03	1.43	163.72												
08/16/95	4:00:00	30	-0.11	2.24	305.91	2.24	177.19	0.82	13.46	0.29	0.87	1.88							
08/16/95	4:00:00	100	-0.15	2.48	307.22	2.48	176.54	1.06	12.82	0.25	1.11	3.19	0.24	-0.65	-0.04	0.24	1.31		
08/16/95	4:00:00	300	1.35	1.63	307.68	2.12	219.63	0.69	55.91	1.75	0.26	3.65	-0.13	42.44	1.46	-0.61	1.77		
08/24/95	4:00:00	10	-1.61	-1.50	300.66	2.20	47.03												
08/24/95	4:00:00	30	-2.85	-1.95	300.94	3.45	55.62	1.25	8.59	-1.24	-0.45	0.28							
08/24/95	4:00:00	100	-7.22	-3.64	301.28	8.09	63.24	5.89	16.22	-5.61	-2.14	0.62	4.63	7.63	-4.37	-1.69	0.34		
08/24/95	4:00:00	300	-10.32	-5.02	303.51	11.48	64.06	9.28	17.03	-8.71	-3.52	2.85	8.02	8.44	-7.47	-3.07	2.57		
08/25/95	4:00:00	10	-2.08	-0.71	304.55	2.20	71.15												
08/25/95	4:00:00	30	-3.02	-0.98	304.80	3.18	72.02	0.98	0.87	-0.94	-0.27	0.25							
08/25/95	4:00:00	100	-7.00	-1.39	304.72	7.14	78.77	4.94	7.62	-4.92	-0.68	0.17	3.96	6.75	-3.98	-0.41	-0.08		
08/25/95	4:00:00	300	-9.30	-0.78	306.68	9.33	85.21	7.13	14.05	-7.22	-0.07	2.13	6.16	13.18	-6.28	0.20	1.88		

Date	Time (UTC)	height (meters)	u (m/s)	v (m/s)	virt. temp (Deg. K)	speed (m/s)	direction (Degrees)	change from 10 meters				change from 30 meters					
								speed (m/s)	direction (Degrees)	u (m/s)	v (m/s)	virt. temp (Deg. K)	speed (m/s)	direction (Degrees)	u (m/s)	v (m/s)	virt. temp (Deg. K)
08/12/95	13:00:00	10	0.10	1.00	302.69	1.00	185.71	0.37	9.95	0.27	0.32	0.05	-0.39	-23.29	-0.50	-0.35	1.50
08/12/95	13:00:00	30	0.37	1.32	302.74	1.37	195.66	-0.03	-13.34	-0.23	-0.03	1.55	-0.62	-10.33	-0.30	-0.57	3.20
08/12/95	13:00:00	100	-0.13	0.97	304.24	0.98	172.37	-0.25	-0.38	-0.03	-0.25	3.25					
08/12/95	13:00:00	300	0.07	0.75	305.94	0.75	185.33										
08/18/95	13:00:00	10	-1.06	0.29	305.41	1.10	105.30										
08/18/95	13:00:00	30	-1.01	0.58	305.45	1.16	119.87	0.07	14.57	0.05	0.29	0.04					
08/18/95	13:00:00	100	-1.34	0.24	306.38	1.36	100.15	0.26	-5.15	-0.28	-0.05	0.97	0.20	-19.71	-0.33	-0.34	0.93
08/18/95	13:00:00	300	-0.14	-1.40	307.75	1.41	5.71	0.31	-99.59	0.92	-1.69	2.34	0.24	-114.16	0.87	-1.98	2.30
08/19/95	13:00:00	10	0.05	-0.04	306.16	0.06	308.66										
08/19/95	13:00:00	30	0.23	-0.07	306.11	0.24	286.93	0.18	-21.73	0.18	-0.03	-0.05					
08/19/95	13:00:00	100	-0.03	-0.69	306.54	0.69	2.49	0.63	53.83	-0.08	-0.65	0.38	0.45	-284.44	-0.26	-0.62	0.43
08/19/95	13:00:00	300	-1.28	-3.56	307.89	3.78	19.78	3.72	71.12	-1.33	-3.52	1.73	3.54	-267.15	-1.51	-3.49	1.78
08/26/95	13:00:00	10	-0.56	-1.84	302.26	1.92	16.93										
08/26/95	13:00:00	30	-0.35	-2.02	302.14	2.05	9.83	0.13	-7.10	0.21	-0.18	-0.12					
08/26/95	13:00:00	100	-1.20	-2.30	301.66	2.59	27.55	0.67	10.63	-0.64	-0.46	-0.60	0.54	17.72	-0.85	-0.28	-0.48
08/26/95	13:00:00	300	-4.19	-2.64	305.69	4.95	57.79	3.03	40.86	-3.63	-0.80	3.43	2.90	47.96	-3.84	-0.62	3.55
08/29/95	13:00:00	10	-2.64	0.08	302.06	2.64	91.74										
08/29/95	13:00:00	30	-3.74	0.15	302.01	3.74	92.30	1.10	0.56	-1.10	0.07	-0.05					
08/29/95	13:00:00	100	-6.39	0.82	302.44	6.44	97.31	3.80	5.58	-3.75	0.74	0.38	2.70	5.02	-2.65	0.67	0.43
08/29/95	13:00:00	300	-6.27	2.65	305.79	6.81	112.91	4.17	21.18	-3.63	2.57	3.73	3.06	20.61	-2.53	2.50	3.78
08/06/95	18:00:00	10	2.16	2.46	304.35	3.27	221.28										
08/06/95	18:00:00	30	2.17	2.53	304.35	3.33	220.62	0.06	-0.66	0.01	0.07	0.00					
08/06/95	18:00:00	100	2.20	2.78	304.35	3.55	218.36	0.27	-2.93	0.04	0.32	0.00	0.21	-2.26	0.03	0.25	0.00
08/06/95	18:00:00	300	2.00	3.13	304.47	3.71	212.58	0.44	-8.71	-0.16	0.67	0.12	0.38	-8.04	-0.17	0.60	0.12
08/08/95	18:00:00	10	2.32	1.86	307.21	2.97	231.28										
08/08/95	18:00:00	30	2.42	2.06	306.31	3.18	229.59	0.20	-1.69	0.10	0.20	-0.90					
08/08/95	18:00:00	100	1.68	2.85	305.26	3.31	210.52	0.33	-20.76	-0.64	0.99	-1.95	0.13	-19.08	-0.74	0.79	-1.05
08/08/95	18:00:00	300	1.44	3.16	305.35	3.47	204.50	0.50	-26.78	-0.88	1.30	-1.86	0.29	-25.10	-0.98	1.10	-0.96

Date	Time (UTC)	height (meters)	u (m/s)	v (m/s)	virt. temp (Deg. K)	speed (m/s)	direction (Degrees)	change from 10 meters				change from 30 meters						
								speed (m/s)	direction (Degrees)	u (m/s)	v (m/s)	virt. temp (Deg. K)	speed (m/s)	direction (Degrees)	u (m/s)	v (m/s)	virt. temp (Deg. K)	
08/12/95	18:00:00	10	0.00	0.57	309.17	0.57	180.00											
08/12/95	18:00:00	30	0.21	0.49	308.82	0.53	203.20	-0.04	23.20	0.21	-0.08	-0.35						
08/12/95	18:00:00	100	0.50	0.82	308.24	0.96	211.37	0.39	31.37	0.50	0.25	-0.93	0.43	8.17	0.29	0.33	-0.58	
08/12/95	18:00:00	300	-0.19	0.40	307.18	0.44	154.59	-0.13	-25.41	-0.19	-0.17	-1.99	-0.09	-48.61	-0.40	-0.09	-1.64	
08/18/95	18:00:00	10	-2.22	-0.72	310.64	2.33	72.03											
08/18/95	18:00:00	30	-2.37	-0.53	310.29	2.43	77.39	0.09	5.36	-0.15	0.19	-0.35						
08/18/95	18:00:00	100	-2.37	-0.60	309.22	2.44	75.79	0.11	3.76	-0.15	0.12	-1.42	0.02	-1.60	0.00	-0.07	-1.07	
08/18/95	18:00:00	300	-2.19	-1.71	308.76	2.78	52.02	0.44	-20.01	0.03	-0.99	-1.88	0.35	-25.38	0.18	-1.18	-1.53	
08/19/95	18:00:00	10	1.30	-0.85	310.83	1.55	303.18											
08/19/95	18:00:00	30	1.41	-0.83	310.69	1.64	300.48	0.08	-2.70	0.11	0.02	-0.14						
08/19/95	18:00:00	100	1.29	-1.28	309.85	1.82	314.78	0.26	11.60	-0.01	-0.43	-0.98	0.18	14.29	-0.12	-0.45	-0.84	
08/19/95	18:00:00	300	1.43	-1.12	309.83	1.82	308.07	0.26	4.89	0.13	-0.27	-1.00	0.18	7.59	0.02	-0.29	-0.86	
08/26/95	18:00:00	10	-1.55	-5.58	309.14	5.79	15.52											
08/26/95	18:00:00	30	-1.88	-6.04	308.33	6.33	17.29	0.53	1.77	-0.33	-0.46	-0.81						
08/26/95	18:00:00	100	-1.93	-6.96	306.99	7.22	15.50	1.43	-0.03	-0.38	-1.38	-2.15	0.90	-1.79	-0.05	-0.92	-1.34	
08/26/95	18:00:00	300	-0.86	-6.35	306.95	6.41	7.71	0.62	-7.81	0.69	-0.77	-2.19	0.08	-9.58	1.02	-0.31	-1.38	
08/28/95	18:00:00	10	-2.52	-3.32	308.80	4.17	37.20											
08/28/95	18:00:00	30	-2.76	-3.73	307.86	4.64	36.50	0.47	-0.70	-0.24	-0.41	-0.94						
08/28/95	18:00:00	100	-1.31	-4.86	306.65	5.03	15.09	0.87	-22.11	1.21	-1.54	-2.15	0.39	-21.41	1.45	-1.13	-1.21	
08/28/95	18:00:00	300	-1.07	-5.65	306.47	5.75	10.72	1.58	-26.48	1.45	-2.33	-2.33	1.11	-25.78	1.69	-1.92	-1.39	
08/29/95	18:00:00	10	-1.17	1.24	309.42	1.70	136.66											
08/29/95	18:00:00	30	-1.11	1.43	308.81	1.81	142.18	0.11	5.52	0.06	0.19	-0.61						
08/29/95	18:00:00	100	-1.53	0.33	307.61	1.57	102.17	-0.14	-34.49	-0.36	-0.91	-1.81	-0.25	-40.01	-0.42	-1.10	-1.20	
08/29/95	18:00:00	300	-0.72	-0.58	307.51	0.92	51.15	-0.78	-85.52	0.45	-1.82	-1.91	-0.89	-91.03	0.39	-2.01	-1.30	

Appendix 3

Changes of meteorological variables measured from the OV-10 aircraft during approaches to Memphis International Airport.

date	time (UTC)	run way	height (meters)	virt. pot. temp. (K)	wind speed (m/s)	wind direct. (degrees)	u (m/s)	v (m/s)	differences from 30 meter value				
									virt. pot. temp. (K)	wind speed (m/s)	wind direct. (degrees)	u (m/s)	v (m/s)
8/19/95	12:39:24	27	30	304.30	0.96	48.81	-0.72	-0.62					
			100	304.53	0.58	70.59	-0.40	-0.27	0.23	-0.38	21.78	0.32	0.35
			300	306.36	4.42	52.13	-3.49	-2.71	2.06	3.46	3.32	-2.77	-2.10
8/19/95	13:02:09	27	30	304.87	1.53	59.56	-1.30	-0.77					
			100	304.78	1.96	39.48	-1.24	-1.51	-0.09	0.43	-20.08	0.06	-0.74
			300	306.21	4.52	48.71	-3.40	-2.98	1.34	2.99	-10.85	-2.09	-2.22
8/26/95	17:47:50	27	30	306.55	7.58	19.10	-2.47	-7.15					
			100	306.50	7.54	11.39	-1.47	-7.36	-0.05	-0.03	-7.71	1.00	-0.21
			300	305.95	9.44	23.18	-3.71	-8.67	-0.60	1.86	4.09	-1.24	-1.51
8/12/95	13:03:25	36R	30	302.20	3.53	150.97	-1.71	3.08					
			100	303.14	3.00	175.55	-0.23	2.98	0.94	-0.53	24.58	1.48	-0.10
			300	304.61	3.13	167.30	-0.69	3.05	2.42	-0.40	16.33	1.02	-0.03
8/12/95	13:09:35	36R	30	302.35	2.63	173.04	-0.33	2.59					
			100	302.61	3.40	194.94	0.88	3.28	0.26	0.76	21.90	1.21	0.69
			220	304.30	2.70	164.49	-0.72	2.60	1.95	0.06	-8.55	-0.39	0.01
8/15/95	3:58:15	36R	30	303.40	6.27	159.17	-2.23	5.86					
			100	304.54	7.75	169.66	-1.39	7.62	1.14	1.47	10.49	0.83	1.75
			300	305.64	8.02	186.11	0.85	7.97	2.23	1.74	26.94	3.08	2.11
8/16/95	3:45:15	36R	30	304.57	3.27	150.43	-1.61	2.82					
			100	305.73	3.27	168.82	-0.63	3.20	1.15	0.01	18.38	0.98	0.38
			300	306.44	3.31	194.57	0.83	3.21	1.87	0.05	44.14	2.44	0.38
8/16/95	3:53:50	36R	30	305.32	3.63	155.50	-1.50	3.30					
			100	305.81	3.56	170.08	-0.61	3.51	0.49	-0.07	14.58	0.89	0.20
			300	306.34	3.26	203.34	1.29	3.00	1.03	-0.37	47.84	2.80	-0.30
8/16/95	4:13:00	36L	30	303.70	3.22	157.63	-1.23	2.98					
			100	305.60	3.21	168.83	-0.62	3.15	1.90	-0.01	11.20	0.60	0.17
			300	306.22	3.11	202.40	1.19	2.88	2.53	-0.11	44.77	2.41	-0.10
8/17/95	0:07:50	36R	30	308.24	2.93	149.00	-1.50	2.48					
			100	308.21	3.35	152.32	-1.55	2.96	-0.04	0.41	3.32	-0.05	0.49
			300	308.22	3.14	134.11	-2.26	2.19	-0.02	0.21	-14.89	-0.75	-0.29
8/17/95	0:14:38	36R	30	308.07	3.24	153.11	-1.45	2.88					
			100	308.05	3.68	155.35	-1.53	3.34	-0.01	0.43	2.25	-0.08	0.46
			210	308.17	2.33	104.95	-2.25	0.60	0.11	-0.92	-48.16	-0.80	-2.28
8/23/95	3:57:05	36L	30	300.84	5.58	54.23	-4.49	-3.25					
			100	301.23	6.19	59.28	-5.31	-3.14	0.39	0.62	5.05	-0.82	0.11
			300	302.21	14.19	63.60	-12.70	-6.31	1.37	8.61	9.37	-8.21	-3.06
8/23/95	4:10:25	36L	40	300.71	5.61	57.99	-4.72	-2.90					
			100	301.00	6.46	62.37	-5.71	-3.01	0.29	0.86	4.38	-0.99	-0.11
			300	301.81	13.87	65.01	-12.57	-5.85	1.10	8.27	7.02	-7.85	-2.96
8/23/95	4:23:52	36L	30	300.35	5.09	67.34	-4.64	-1.97					
			100	300.70	6.68	64.09	-6.00	-2.90	0.35	1.59	-3.25	-1.36	-0.93
			300	302.47	14.81	67.28	-13.66	-5.72	2.13	9.72	-0.06	-9.01	-3.74
8/26/95	18:44:28	36R	30	307.51	4.64	37.07	-2.50	-3.52					
			100	306.43	7.08	46.30	-5.11	-4.88	-1.08	2.43	9.24	-2.60	-1.36
			300	306.49	6.15	19.59	-2.07	-5.75	-1.02	1.50	-17.47	0.43	-2.23
8/29/95	0:13:13	36R	60	307.04	3.92	57.49	-3.27	-2.11					
			100	307.00	4.58	48.59	-3.40	-2.99	-0.03	0.66	-8.90	-0.13	-0.89
			300	307.16	6.03	52.31	-4.77	-3.67	0.12	2.11	-5.19	-1.50	-1.56

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13. ABSTRACT (Maximum 200 words) As part of the NASA Terminal Area Productivity Program, Langley Research Center embarked on a series of field measurements of wake vortex characteristics and associated atmospheric boundary layer properties. One measurement period was at the Memphis International Airport in August 1995. Atmospheric temperature, humidity, winds, turbulence, radiation, and soil properties were measured from a variety of sensor systems and platforms including sodars, profilers, aircraft and towers. This research focused on (1) changes that occurred in tower data during sunrise and sunset transitions, (2) vertical variation of temperature and cross-head winds at selected times utilizing combinations of sensors, and (3) changes measured by an OV-10 aircraft during approaches and level flights. Significant but not unusual changes are documented and discussed in terms of expected boundary layer behavior. Questions on measurement and prediction of these changes from existing and near-term capabilities are discussed in the context of a future Aircraft Vortex Spacing System.				
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